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Indicts Thomas Paper Stock Co. in Chicago

Federal Grand Jury Charges Violation of OPA Regulations Covering Ceiling Prices On Waste Paper—Indictment Also Alleges False And Evasive Charges For Transportation — One of Largest Cases.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., December 20, 1943—Indictment of the Thomas Paper Stock Company of Chicago on 47 counts charging violations of OPA regulations covering ceiling prices on waste paper, was returned by a federal grand jury in the U. S. District court on Friday, November 17.

Alvin E. Sandroff Also Named

Alvin E. Sandroff, president of the company, also was named in the indictment which was announced by J. Albert Woll, U. S. district attorney for the Northern Illinois district.

In addition to counts charging sales at over-ceiling prices, there are many counts in the indictment alleging false, illegal, and evasive charges for transportation and loading upgraded paper, contrary to OPA Maximum Price Regulation No. 30, which prohibits such practices.

200 Carloads of Waste Paper Involved

Officials of OPA estimate that transactions of more than 200 carloads of waste paper, amounting to overcharges conservatively estimated at $25,000, and approximately 750 tons of waste paper, are involved in the case against the indicted company.

One of Largest Waste Paper Cases

The case is one of the largest in the United States involving waste paper price violations.

Among the firms to whom the Thomas Paper Stock Company is charged with having sold paper in violation of OPA price regulations are the United States Gypsum Company, Gypsum, Ohio; United Paperboard Company, Urbana, Ohio and Thomson, N. Y., and the International Paper Company of Niagara Falls, N. Y.

Statement by Alex Elson

Alex Elson, acting regional administrator of the Office of Price Administration, said in commenting on the indictment:

"The Office of Price Administration has been working with the War Production Board in an effort to assure ample supply of waste paper for many important civilian and military needs. We have been aware in the last few months of activities in the trade that were severely disrupting the operations of the price regulations and the supply of waste paper.

"We greatly appreciate the splendid cooperation which has been given to this office by J. Albert Woll, U. S. District Attorney and his assistant, Wm. J. McCormick, in the handling of this case."

To Limit Wrapping Paper Products

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 22, 1943—The use of wrapping paper, including wrapping tissue, in the manufacture of converted paper products will be restricted during 1944 to approximately 65% of the 1942 base period production, the WPB Paper Division announced today.

This is done of necessity since paper-making supplies, especially kraft pulp, are so short. An amendment to Conservation Order M-241-a, issued today, imposes the above restriction, which includes items such as package gift wraps for home consumption, it was pointed out, but does not affect industrial or commercial wrapping.

Another amendment removes restrictions on the manufacture of paper seed packets for use by the growers and packers of seeds. The placing of that item on the unrestricted list was at the request of the War Food Administration. Paper tea ball bags and similar containers have been removed from the list held to 80% and placed on the unrestricted list because of a large portion of the United States tea supply consists of "small broken leaf fannings, siftings or dust," requiring packing in paper bags.

Shirt bands, as essential laundry item, have been placed in the 100% category, which will make it possible to produce approximately the same number as were made in 1942.

Fabrication of paper cases for flashlights has been excluded from the order but the restrictions of Limitation Order L-71, controlling flashlight production, will control the manufacture of paper cases hereafter.

Pressure of Orders Tightens Paper Market

Insistent Demand For All Lines of Paper Continues With Some Backlog Orders Dating Back Six Months—Study Proposed Tonnage Cut—Salesmen Ready For Annual Party—Other Late Trade News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., December 20, 1943—Pressure continues from the buying end for more and more paper and all grades, despite their previous classifications and general acceptance, are engulfed in a wave of supplications from buyers. The tightness shows no signs of abating and the expected upturn in the availability of civilian goods is considered very likely to increase the seriousness of the situation.

Locally, the WPB conservation program is working out fairly well and mills are consistently being fed waste paper from this area. Retail outlets are cooperating in selling merchandise packed in its original packages and have been quick to cooperate in the over-all salvage program. Waste papers showed little disposition to recognize this fact, however, as the supply still fell far short of requirements. Krafts, newsprints and groundwoods simply retained the position of trying to keep "moving" while jobbers worked under serious handicaps to try to satisfy regular customers. Book and cover papers remained unchanged while all grades of sulphites were ranging six months behind in their order backlogs.

Study Proposed Tonnage Reductions

Chicago paper trade executives expressed much interest this week in the news that the paper and pulp industry is expected to reduce its over-all transportation tonnage requirements in 1944 by a marked reduction in cross-hauling as well as by heavier carloading and speedier turn-arounds. The forest products bureau of the WPB is credited with making the announcement of these plans. It is understood that F. E. Hufford, government presiding head of the pulp and paper transportation industry advisory committee, believes the transportation situation in the industry is now extremely critical. While the load has increased, according to local paper trade executives, the facilities have not been expanded in proportion and weekly carloadings are running far ahead of last year with revenue ton miles for the first ten months of 1943 increasing 15% over the same period a year ago. Complication of difficulties because of geographical shifts in traffic which affect man power are also recited as reasons for the proposed reductions. In general, the industry here learns that cross hauling and excessive hauling by the pulp and paper manufacturers must be reduced. Methods by which this reduction can be accomplished are being carefully considered by the WPB divisions interested in this subject and will be related to committee members in the near future, it is understood here.

ICC Considers Classification Change

The Interstate Commerce Commission opened hearings in Chicago this week on the suspension of supplement number 37 to rule 33 of consolidated freight classification. The rule covers multiple shipments and the proposed supplement, suspended in November, would have made shippers liable for the safe transportation of such multiple shipments by amending the rule to read that "consignors whose shipments are loaded in or on a single car as authorized by this rule shall be responsible for so loading the car that a consignee at an intermediate destination can remove the shipment consigned to him without damage to the remaining shipment or shipments. Such consignor shall be responsible for such restowing or rebracing of each such shipment remaining in the car at a destination intermediate to the final destination as shall be necessary for the safe transportation thereof to its destination."

Salesmen Ready for Annual Party

The western division of the Salesmens Association of the Paper Industry is all set for its annual Christmas party which will be held at the Hotel Sherman on December 29. The affair will get under way at 5 p.m. under the chairmanship of Burt Fisher and the meeting will provide the members with an opportunity to pay signal honor to salesmen in the armed forces, all of whom have been invited to attend and all who are unable to attend have been asked to write letters so that they, by proxy, may join in the festivities.

Discusses Timber Conservation

Plans to conserve timber by government control at Federal or State levels, were outlined in Chicago this week by Lyle F. Watts, chief of the forest service, Department of Agriculture. Mr. Watts, speaking at the annual meeting of the National Lumber Manufacturers Association, said such regulation of private timber cutting would be fully warranted because of the depleted condition of the nation's forests. The speaker pointed out that much second growth timber is being cut prematurely and warned that this depletion has curtailed industrial activity in many localities and probably would affect many more. Annual sawtimber growth, he said, is now far below the level required for an economy of abundance in the post war period. The Department of Agriculture representative recommended a three point national program to assure ample supplies of forest products. The first was increased public interest and cooperation in fire protection; the second, increased public ownership of lands unsuited to private operation and, finally, public regulation that would keep reasonably productice "all forest lands cut over in the future."

Support Waste Salvage Program

Newspapers in Illinois have pledged their full support to the Victory Waste Paper Campaign according to the Chicago headquarters of the Inland Daily Press Association which reports that most members are fully cooperating in local drives and are putting to effective use the manual of suggestions, mats and suggested copy furnished by the newspaper committee.

A TIME TO PAUSE - - -

THE HOURS remaining in *'forty-three* are ebbing fast.

Long since, the Paper industry has been absorbed in plans for next year.

But before they're realized . . . let's pause for a moment and review the year just passed.

The requirements of the armed services have been completely satisfied and at the same time civilian needs have not been neglected. In *'forty-three* WPB has done a job —the percentage allotment worked out better, much better, than any of us had reason to hope for.

The intermediates, dyestuffs, chemicals, camouflage materials, sulfa drugs . . . we, here at Calco, were asked to make . . . are now serving the men who do the fighting.

Naturally, these war-production activities limited our normal civilian supplies.

But our customers understood.

For *'forty-four* . . . we are reluctant to make predictions, but we pledge every effort to the task of bringing our service back to something near normal.

One thing certain, our application laboratories stand ready to help our customers meet the problems which this new year will bring.

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Two Mills Offer to Buy Large Forest Tract

Nekoosa-Edwards Paper Co. Submits Bid For 45,418 Acres of Timber Land and Tomahawk Kraft Paper Co. Also Makes Offer— New Process Would Utilize Milkweed Plant — Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 18, 1943—Forest lands in Oneida County, Wisconsin, on which the Nekoosa-Edwards Paper Company, Port Edwards, Wis., submitted a bid last week are also sought by the Tomahawk Kraft Paper Company, Tomahawk, Wis. A decision on the sale will be made by the Oneida County board at a meeting at Rhinelander, Wis., January 6.

The Nekoosa-Edwards bid is $125,346.68 for an estimated 45,418 acres, on a basis of $2.76 per acre, and was accompanied by a certified check for $10,000. The offer of Tomahawk Kraft is a flat $65,000 for the tract. The latter company already owns several thousand acres in the vicinity, purchased November 13 for $12,631.

Carl Willin, district forester, made a thorough cruise of the area, and on his findings the forestry committee placed a valuation of $163,266.30 on the land, approximately $38,000 higher than the Nekoosa-Edwards bid. Estimated stumpage value of the area is $49,474.30, and it is estimated it will be worth from three to five times that amount within the next ten years.

Considerable plantings and improvements were made on the tract within recent years by the Civilian Conservation Corps, including fire hazard reductions and road construction.

Process Would Utilize Milkweed

Dr. Boris Berkman, research associate of the Institute of Paper Chemistry, Appleton, Wis., has invented a process which utilizes milkweed for a moisture-repellent product six times as bouyant as cork and six times lighter than wool. It solves the problem of a substitute for kapok, used in life jackets. A jacket using three pounds of the milkweed floss will hold a man afloat for about 100 hours.

In the course of his studies, Dr. Berkman invented a machine similar to a cotton gin which removes the seeds from the fluffy contents of the milkweed pod. An experimental factory for producing the floss was started in Chicago, but has been superseded by a plant in Petoskey, Mich., which began production July 1, 1943. An enlargement of the plant, financed by the government, was expected to be started this month. The factory contains seven machines capable of producing 1,000,000 pounds of floss annually.

Since milkweed grows wild everywhere, the source of material is the collections made by individuals at 15 cents a bag for green pods and 20 cents for dry pods. Last year 250,000 bags were gathered in Michigan.

Production costs can be cut by developing useful by-products, Dr. Berkman finds. Two out of three types of fibers in the stalk are found useful. One, the "bast" fiber, contains 92 per cent alpha-cellulose, which compares favorably with cotton. It is useful in making gun cotton, textiles including a cloth that ranks only second to jute in toughness, and a strong paper. Another fiber containing lignin can be turned into fine plastics. The seeds yield an oil which is used in paints and varnishes. It resembles soy bean oil and can be made edible. The seed cake makes a food for livestock.

When planted commercially, utilizing waste lands where nothing else will grow, the yield is one and a half tons of leaves and pods per acre, bringing a return of $40 to $50 per acre yearly.

Brush Fire Destroys Pulpwood

Several hundred acres of pulpwood were destroyed in brush fires which last week swept over nearly 1,200 acres of land in Marathon County, Wisconsin. Immediate recruiting of 100 volunteer members of the Civilian Defense forest fire fighters brought the fires under control before they could spread further.

Paper Mills Give Christmas Parties

At a Christmas dinner party of more than 300 employees of the Neenah Paper Company, Neenah, Wis., at Germania Hall, Menasha, Wis., on the same evening, 98 who have worked for the firm for more than 20 years were given recognition, as well as 43 who are now serving in the armed forces.

D. K. Brown, president, and Leo Schubart, secretary-treasurer, spoke briefly conveying congratulations and holiday greetings. Kimberly Stuart, vice-president, presided and the guest toastmaster was Lieut. (j.g.) Fred Leech of the United States Coast Guard, who is captain of the port at Ludington, Mich.

William Owen is the ranking member of the Old Timers Club, having been an employee for 57 years.

Approximately 500 employees of the Gilbert Paper Company, their wives and guests were entertained at a Christmas party at Germania hall, Menasha, Sunday evening, December 19. Santa Claus distributed turkeys, geese and ducks. Cards and dancing were enjoyed and prizes were given. The company recently gave its employees bonus checks totaling between $4,000 and $5,000.

All employees of the Bergstrom Paper Company, Neenah, Wis., received Christmas bonus checks recently, and the Menasha Products division of the Marathon Paper Mills Company, Menasha, Wis., sent checks recently to all its former employees now in the armed services.

Engineers Club Meets

Kimberly-Clark Engineers Club of Neenah, Wis., held a dinner at Hotel Menasha, Menasha, Wis., December 15. The speaker was C. A. Fourness, Kimberly-Clark Corporation executive, whose subject was "History and Development of Crepe Wadding."

J. J. Plank Is Honored

J. J. Plank, president of Joseph J. Plank & Company of Appleton, Wis., manufacturers of dandy rolls, was honored at a testimonial dinner December 9 at the American Legion clubhouse at Appleton. He has served as a member of the Appleton Water Works Commission (municipal) for 26 years, and for 20 years has been the chairman. He was presented with a certificate by Mayor John Goodland, Jr.

And think of the dollars saved, too

YES, every time you can use Taylor Spiral Pipe for one of those jobs where heavier pipe has been used in the past, you conserve steel and cut costs!

And you won't have to look very far for an application for Taylor Spiral Pipe either. Listed opposite are a few of the services that have been satisfactorily and economically handled by Taylor Spiral Pipe for many years. And a full list would include many more uses. In most plants Standard Thickness Pipe is largely used for such services. It seems to have been a sort of tradition of industry to specify this heavier-than-necessary pipe for ordinary, everyday uses of this kind.

But more and more plants are breaking away from the heavy-pipe habit. They are finding that it pays real dividends—that light but strong Taylor Spiral Pipe can satisfactorily handle a big percentage of the jobs ordinarily assigned to Standard Thickness Pipe—that in many cases its installed cost is no more than half that of the heavy pipe it so well replaces.

Switching to Taylor Spiral Pipe for services like those listed is made practical by the range of sizes and variety of fittings. Thicknesses range from 18 to 6 gauge; joint lengths to 40 ft. All types of end joints, all kinds of fittings and "specials" or fabricated assemblies are produced, providing a complete service with undivided responsibility.

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Announce Awards for U. S. Printing Office

Joint Congressional Committee On Printing Lets Contracts For Furnishing Paper For Three Months' Period Beginning January 1, 1944 — List of Successful Bidders and Quantities Awarded.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 21, 1943—The Joint Congressional Committee on Printing today made awards for paper for the use of the Government Printing Office for the three months period beginning January 1. Bids were received December 13. The awards were as follows;

No. 1, Marquette Paper Corp., 2.90 cents (600,000 pounds).

No. 2, D. L. Ward Co., 5.68 cents.

No. 4, Barton, Duer & Koch Paper Co., 7.90 cents.

No. 5, Barton, Duer & Koch Paper Co., 7.90 cents.

No. 6, Marquette Paper Corp., 7.49 cents.

No. 7, Marquette Paper Corp., 7.19 cents.

No. 8, Paper Corp. of U. S., 7.28 cents.

No. 9, Allied Paper Mills, 7.30 cents.

No. 10, Barton, Duer & Koch Paper Co., 6.90 cents.

No. 18, Wilcox, Walter Furlong Paper Co., 7.39 cents.

No. 19, Paper Corp. of U. S., 8.69 cents (150,000 pounds); Central Ohio Paper Co., 8.52 cents (750,000 pounds); Aetna Paper Co., 8.68 cents (100,000 pounds).

No. 20, Aetna Paper Co., 8.12 cents.

No. 21, R. P. Andrews Paper Co., 7.49 cents (500,000 pounds); Paper Corp. of U. S., 7.56 cents (500,000 pounds); Whitaker Paper Co., 7.42 cents (400,000 pounds); Aetna Paper Co., 7.56 cents (100,000 pounds).

No. 22, Swigart Paper Co., 6.93 cents.

No. 23, Allied Paper Mills, 8.55 cents.

No. 24, Allied Paper Mills, 15.57 cents.

No. 33, Stanford Paper Co., 7.71 cents.

No. 34, Stanford Paper Co., 7.17 cents.

No. 35, Central Ohio Paper Co., 7.04 cents.

No. 36, R. P. Andrews Paper Co., 6.84 cents (500,000 pounds); Mudge Paper Co., 6.84 cents (500,000 pounds).

No. 37, Barton, Duer & Koch Paper Co., 6.30 cents (200,000 pounds).

No. 38, Barton, Duer & Koch Paper Co., 5.87 cents (350,000 pounds).

No. 41, Perkins-Goodwin Co., 8.78 cents (300,000 pounds).

No. 43, Walker Goulard Plehn Co., 15.00 cents.

No. 44, Mead Sales Co., 5.55 cents (1,000,000 pounds); Old Dominion Paper Co., 5.5624 cents (1,000,000 pounds).

No. 45, Whitaker Paper Co., 6.91 cents.

No. 46, Cauthorne Paper Co., 8.25 cents.

No. 47, Aetna Paper Co., 9.72 cents (200,000 pounds); Old Dominion Paper Co., 9.46 cents (200,000 pounds).

No. 48, R. P. Andrews Paper Co., 12.83 cents (125,000 pounds); D. L. Ward Co., 12.74 cents (125,000 pounds).

No. 50, Marquette Paper Corp., 6.40 cents (500,000 pounds); Walker Goulard Plehn Co., 6.40 cents (400,000 pounds).

No. 51, Whitaker Paper Co., 6.40 cents (200,000 pounds); Frank Parsons Paper Co., 6.40 cents (400,000 pounds); Wilcox Walter Furlong Co., 6.40 cents (600,000 pounds); Old Dominion Paper Co., 6.40 cents (100,000 pounds).

No. 52, Bermingham & Prosser Co., 6.50 cents.

No. 55, Marquette Paper Corp., 7.85 cents (400,000 pounds); D. L. Ward Co., 7.85 cents (500,000 pounds); Whitaker Paper Co., 7.69 cents (3,100,000 pounds).

No. 56, R. P. Andrews Paper Co., 7.19 cents (1,500,000 pounds); Barton, Duer & Koch Paper Co., 7.25 cents (1,000,000 pounds).

No. 57, Bulkley, Dunton & Co., 7.515 cents (500,000 pounds); Marquette Paper Corp., 7.61 cents (350,000 pounds); Butler Co., 6.40 cents (150,000 pounds); D. L. Ward Co., 7.61 cents (500,000 pounds).

No. 58, R. P. Andrews Paper Co., 6.89 cents (1,000,000 pounds); Central Ohio Paper Co., 6.65 cents (50,000 pounds).

No. 59, Marquette Paper Corp., Sub. No. 32, 8.54 cents. Sub. No. 36, 8.09 cents (1,250,000 pounds).

No. 64, Aetna Paper Co., 15.36 cents.

No. 65, Stanford Paper Co., 15.50 cents (100,000 pounds); Aetna Paper Co., 15.07 cents (200,000 pounds).

No. 66, Barton, Duer & Koch Paper Co., 16.67 cents.

No. 67, Mudge Paper Co., 17.00 cents.

No. 68, Stanford Paper Co., 18.00 cents (50,000 pounds); Franklin Research Co., 18.40 cents (1,950,000 pounds).

No. 71, Old Dominion Paper Co., 9.2199 cents.

No. 72, Old Dominion Paper Co., 8.979 cents.

No. 73, Bradner Smith & Co., 9.75 cents (200,000 pounds); Graham Paper Co., 9.72 cents (200,000 pounds).

No. 75, Marquette Paper Corp., 22.50 cents.

No. 76, Collins Mfg. Co., 19.35 cents (100,000 pounds); Barton, Duer & Koch Paper Co., 19.00 cents (40,000 pounds); Whitaker Paper Co., 18.75 cents (200,000 pounds); Bradner Smith & Co., 18.60 cents (40,000 pounds); Stanford Paper Co., 18.30 cents (40,000 pounds); Stanford Paper Co., 18.60 cents (80,000 pounds); Old Dominion Paper Co., 18.987 cents (50,000 pounds); Old Dominion Paper Co., 19.487 cents (10,000 pounds); Carpenter Paper Co., 18.60 cents (40,000 pounds).

No. 77, Paper Corp. of U. S., 18.72 cents.

No. 78, Barton, Duer & Koch Paper Co., 18.95 cents.

No. 84, Barton, Duer & Koch Paper Co., 27.30 cents.

No. 85, Barton, Duer & Koch Paper Co., 21.25 cents (75,000 pounds); Barton, Duer & Koch Paper Co., 22.25 cents (75,000 pounds).

No. 101, Cauthorne Paper Co., 9.60 cents (500,000 pounds).

No. 102, Eastern Corp., 9.31 cents.

No. 103, Aetna Paper Co., 11.31 cents.

No. 105, Whitaker Paper Co., 15.48 cents.

No. 106, R. P. Andrews Paper Co., 14.35 cents (50,000 pounds); Collins Mfg. Co., 13.95 cents (50,000 pounds); Collins Mfg. Co., 14.25 cents (100,000 pounds); Central Ohio Paper Co., 14.35 cents

Official U. S. Army Signal Corps Photograph

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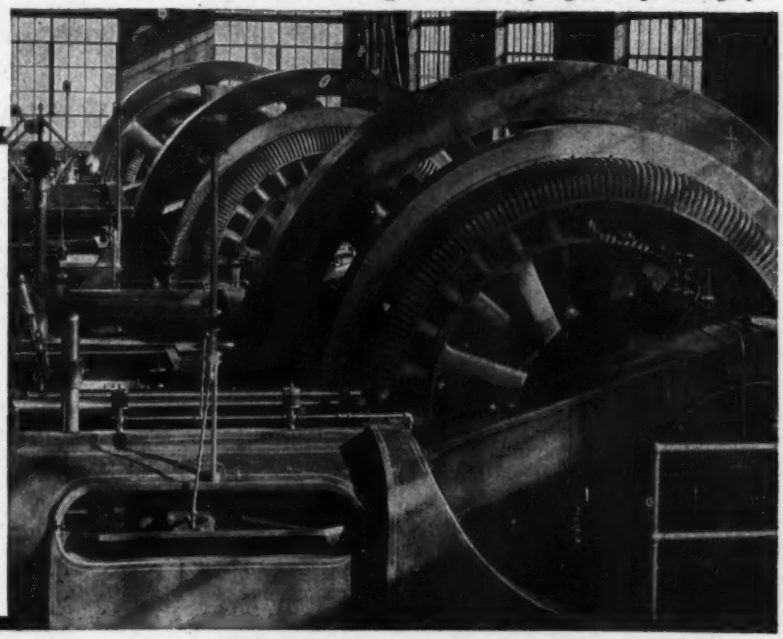

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(450,000 pounds); Cauthorne Paper Co., Inc., 14.35 cents (100,000 pounds); Whitaker Paper Co., 13.86 cents (500,000 pounds); Whitaker Paper Co., 14.35 cents (50,000 pounds); McIntosh Paper Co., 14.35 cents (100,000 pounds); Whitehead & Alliger Co., Inc., 14.35 cents (100,000 pounds); Aetna Paper Co., 14.12 cents (500,000 pounds).

No. 107, Collins Mfg. Co., 13.95 cents (50,000 pounds); Collins Mfg. Co., 14.25 cents (100,000 pounds); Ris Paper Co. Inc., 14.35 cents (100,000 pounds); Aetna Paper Co., 14.12 cents (500,000 pounds); Wilcox Walter Furlong Co., 14.35 cents (100,000 pounds); Messinger Paper Co., 14.35 cents (100,000 pounds); Tobey Fine Papers, Inc., 14.35 cents (100,000 pounds).

No. 108, Collins Mfg. Co., 13.95 cents (50,000 pounds); E. E. Lloyd Paper Co., 14.35 cents (50,000 pounds); Baxter Paper Co., 14.45 cents (100,000 pounds); Aetna Paper Co., 14.12 cents (500,000 pounds).

No. 109, Aetna Paper Co., 16.27 cents (350,000 pounds).

No. 110, Collins Mfg. Co., 14.10 cents (50,000 pounds); Aetna Paper Co., 14.47 cents (350,000 pounds).

No. 111, Collins Mfg Co., 14.10 cents (50,000 pounds); Aetna Paper Co., 14.47 cents (350,000 pounds).

No. 128, Barton, Duer & Koch Paper Co., 22.90 cents.

No. 151, Eastern Corp., 9.60 cents.

No. 152, Eastern Corp., 9.60 cents.

No. 153, Wilcox Walter Furlong Co., 7.78 cents.

No. 154, Collins Mfg Co., 13.52 cents (50,000 pounds); Collins Mfg Co., 14.10 cents (50,000 pounds); Mudge Paper Co., 14.40 cents (200,000 pounds); Walker Goulard Plehn Co., 14.35 cents (100,000 pounds); Aetna Paper Co., 13.93 cents (100,000 pounds).

No. 155, Collins Mfg. Co., 13.52 cents (50,000 pounds); Collins Mfg. Co., 13.97 cents (50,000 pounds); Aetna Paper Co., 13.93 cents (100,000 pounds).

No. 156, Collins Mfg. Co., 14.12 cents (50,000 pounds); Collins Mfg. Co., 14.90 cents (100,000 pounds).

No. 176, Barton, Duer & Koch Paper Co., 20.70 cents.

No. 177, Barton, Duer & Koch Paper Co., 20.65 cents.

No. 183, Wilcox Walter Furlong Co., 7.99 cents.

No. 184, Whitaker Paper Co., 7.67 cents (200,000 pounds); Stanford Paper Co., 7.24 cents (200,000 pounds); Tobey Fine Paper Co., 7.24 cents (200,000 pounds); McIntosh Paper Co., 7.24 cents (200,000 pounds); MacCollum Paper Co., 7.24 cents (200,000 pounds).

No. 189, R. P. Andrews Paper Co., 11.97 cents.

No. 190, Walker Goulard Plehn Co., 15.40 cents (100,000 pounds).

No. 191, Barton, Duer & Koch Paper Co., 15.75 cents (200,000 pounds).

No. 192, R. P. Andrews Paper Co., 12.47 cents.

No. 195, Barton, Duer & Koch Paper Co., 20.20 cents.

No. 196, Barton, Duer & Koch Paper Co., 20.20 cents.

No. 203, R. P. Andrews Paper Co., 8.21 cents.

No. 205, R. P. Andrews Paper Co., 12.10 cents.

No. 208, Walker Goulard Plehn Co., 5.65 cents.

No. 209, Frank Parsons Paper Co., 4.75 cents.

No. 210, Whitaker Paper Co., 5.875 cents (4¾" rolls); 5.625 cents (5¾" and 7½" rolls).

No. 213, R. P. Andrews Paper Co., 18.25 cents (160 pound); 17.25 cents (280 pound).

No. 219, R. P. Andrews Paper Co., 4.65 cents.

No. 252, Bulkley Dunton & Co., $14.62 per M sheets.

No. 254, R. P. Andrews Paper Co., 8.47 cents.

No. 255, Central Ohio Paper Co., 9.15 cents (buff); 9.02 cents (salmon); R. P. Andrews Paper Co., 9.21 cents (moss green).

No. 265, Mudge Paper Co., 8.25 cents.

No. 271, Paper Corp. of U. S., 9.50 cents.

No. 276, Barton, Duer & Koch Paper Co., 8.50 cents.

No. 277, Barton, Duer & Koch Paper Co., 9.50 cents.

No. 280, Mudge Paper Co., 11.25 cents.

No. 302, Old Dominion Paper Co., $33.94 cents per M sheets.

No. 303, Bradner Smith & Co., $48.01 per M sheets.

No. 304, Bradner Smith & Co., $71.53 per M sheets.

No. 305, Old Dominion Paper Co., $42.49 per M sheets.

No. 306, Barton, Duer & Koch Paper Co., 5.50 cents.

No. 308, Walker Goulard Plehn Co., 6.00 cents.

No. 325, R. P. Andrews Paper Co., 5.97 cents (500,000 pounds); Whitaker Paper Co., 5.91 cents (1,000,000 pounds).

No. 326, R. P. Andrews Paper Co., 5.97 cents (1,000,000 pounds).

No. 327, R. P. Andrews Paper Co., 5.97 cents (300,000 pounds); Whitaker Paper Co., 6.01 cents (700,000 pounds).

No. 351, R. P. Andrews Paper Co., $7.15 per C sheets.

No. 352, Bird & Son, Inc., $18.85 per C sheets.

No. 366, Mathers-Lamm Paper Co., 4.135 cents (400,000 pounds).

No. 368, Consolidated Paper Co., 5.40 cents (carloads); 5.87 cents.

H. W. Nichols Made Salvage Chairman

CINCINNATI, Ohio, December 20, 1943—Harold W. Nichols, president of the Fox Paper Company of Lockland, who recently was appointed by Governor Bricker of Ohio as state salvage chairman, has also been chairman of the Hamilton County salvage committee since December, 1941.

As chairman of the Hamilton County salvage committee, he has placed all waste paper in that county on the critical list and for several months past has been engaged in developing waste paper drives throughout the state of Ohio in connection with the salvaging of other materials, such as scrap iron, tin cans and kitchen fats.

The state organization has five or six full-time field men constantly operating throughout the 88 counties, in addition to the many thousands of volunteer workers.

Hooker Gets Third Army-Navy Award

The Hooker Electrochemical Company, Niagara Falls, N. Y., has been awarded the Army-Navy Production Award for the third time. This was announced in a letter from Under Secretary of War Robert P. Patterson addressed to the men and women employees. This award is symbolized by the addition of a second white star to the "E" flag.

Walworth Hi-Test Cast Iron Threaded Pipe

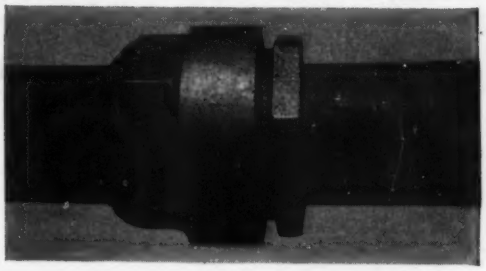
gives these three special advantages

1 CORROSION RESISTANCE where it's needed most

Extra wall thickness at the threads in Walworth Hi-Test Oversize Threaded joint provides greater strength and resistance to corrosion.

2 TIGHT EXPANSION JOINTS

Hi-Test flexible expansion joints, available with Walworth Hi-Test Cast Iron Pipe, provide a tight connection and allow for 1½" expansion or contraction. There are no exposed threads or bolts.



3 FLEXIBILITY IN THE LINE

Notice the unusual flexibility achieved with a Hi-Test expansion joint and two standard 20' lengths of 1¼" Walworth Hi-Test pipe.

Walworth I.P.S. Hi-Test Cast Iron Threaded Pipe with regular pipe size threads is primarily for use in drainage, vent and waste lines in buildings and for pipe lines above or below ground. It complies with Federal Specification No. WW-P-356, dated August 19, 1936, and is recommended in all sizes for 175 lbs. Non-Shock Cold Water Pressure.

Walworth I.P.S. and W.P.S. Hi-Test Pipe with oversize threads are principally for use in underground water and gas distribution systems. For complete details write for Bulletin 57.

You'll find pertinent information on Walworth's complete line of valves, fittings, pipe, and pipe wrenches in the new Walworth Catalog 42. Included are 78 pages of practical engineering data that simplify valve selection and make piping layouts easier. Write, on business stationery, for your free copy. Address: Walworth Company, 60 E. 42nd St., New York 17, N. Y. Dept. D12.

BOSTON WORKS
KEWANEE WORKS

WALWORTH
valves AND fittings

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Expects Industry to Cut Cross Hauls

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 22, 1943—The pulp and paper industry is expected to reduce its over-all transportation ton requirements in 1944 by a reduction in cross hauling and excessive hauling, as well as by heavier carloading and quicker turn arounds, F. E. Hufford, Transportation Consultant of the WPB Forest Products Bureau, announced today.

The transportation situation affecting the pulp and paper industry was reported as critical by Mr. Hufford, Government Presiding Officer of the Pulp and Paper Transportation Industry Advisory Committee.

The load on transportation facilities has increased tremendously but facilities have not been expanded in proportion. Weekly carloadings are running ahead of last year, and revenue ton-miles for the first ten months of 1943 have increased 15 per cent over the same period last year. Some shortages of box cars were reported, and daily surplus reports of cars indicate that a practical working surplus no longer exists.

It was also pointed out that the manpower difficulties of the transportation carriers may be complicated by geographical shifts in traffic. When shifts in traffic require additional transportation workers in acute labor shortage areas, the difficulties are especially great, it was stated.

Shortages of manpower, replacement parts, gasoline and tires threaten trucking industry to sustain its share of the burden.

The pulp and paper industry must conserve every truck and tire which it has, the Industry Advisory Committee was advised by Mr. Hufford, who stated that the industry has been requested to reduce its over-all ton requirements for 1944. The paper industry, it was pointed out, has done a good job in conserving transportation so far by heavier carloading and faster turn around of cars; however, it was the consensus that more can be accomplished in these fields. It was also the opinion of the Committee that cross hauling and excessive hauling by the pulp and paper manufacturers must be reduced. Methods by which this can be accomplished are being carefully considered by the interested divisions of WPB, and will be relayed to the Committee members shortly.

Bill Would Admit Paper Free

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 22, 1943—Representative Boren of Oklahoma has introduced a bill in the House (H.R. 3837) which has been referred to the House Ways and Means Committee to exempt imported paper conforming to certain specifications, from any tariff. The bill is as follows:

That paragraph 1772 of the Tariff Act of 1930 (U. S. C., 1940 edition, title 19, sec. 1201, par. 1772) is hereby amended to read as follows:

"PAR. 1772. Newsprint paper, that is, paper conforming to the following specifications:

"Weight.—A quantity with surface area equal to that of five hundred sheets, each twenty-four by thirty-six inches, shall weigh not less than twenty-five pounds nor more than thirty-five pounds. Samples used to determine the weight of the paper shall be conditioned in an atmosphere maintained at 50% relative humidity and twenty-three degrees Centigrade temperature with a tolerance of plus or minus 2 in the percentage relative humidity and of plus or minus two degrees Centigrade in temperature.

"Thickness.—The thickness shall not exceed forty-two ten-thousandths of an inch.

"Rolls and sheets.—The paper shall be in rolls not less than fourteen inches wide and twenty-eight inches in diameter, or in sheets measuring not less than twenty by thirty inches.

"Stock.—Not less than 70% of the total fiber shall be groundwood.

"Finish.—The average of five tests in machine direction and five tests in cross direction on both sides, moving the paper after each test, made with the Ingersoll glarimeter or by a method giving like results, shall be not more than 50% gloss.

"Ash.—The ash content shall be not more than 6½%.

"Degree of sizing.—The paper shall not contain sizing to a degree which will cause the transudation time of water to exceed ten seconds when the paper is tested by the ground-glass method, or five seconds when the paper is tested by the curl method or with a Valley size tester.

"Color.—If colored, the paper shall be of a color and shade chiefly used in the printing of newspapers, but colored paper in sheets shall not be entitled to free entry under this paragraph."

SEC. 2. This Act shall take effect on the day following the date of its enactment.

Go "All Out" on Waste Drive

Chicago has opened an "all-out" victory waste paper drive with old newspapers, old magazines, old wrapping paper and the contents of wastebaskets as the chief products to be collected. According to local reports, twenty five paper mills are now idle because they do not have sufficient materials and another one hundred mills are said to be working only part time. Local reports stress the fact that this inactivity means production of packaging materials to ship shells and blood plasma, parachutes and signal flares is seriously impaired. Factories are said to be needing an additional 2,000,000 tons of waste paper by February 15 if the war effort isn't to be seriously impeded. A new element—and what is construed here to be a very practical and helpful one—is being injected into the campaign under the direction of area salvage offices. That is the importance of properly packing the waste paper, with the newspapers bundled into packages about twelve inches high and tied securely and magazines and brown paper tied in similarly easily handled bundles.

Woman Admitted to Thilmany Club

Miss Mary Ward, a worker in the finishing room, is the first woman to be admitted into membership of the Quarter Century Club of the Thilmany Pulp and Paper Company, Kaukauna, Wis. At a dinner Sunday evening, December 12, she and fifteen men were received into the organization of veteran workers, bringing the membership to 107.

Engraved gold watches were presented to Carl Busse and Henry Keyzers, who have completed 40 years of service.

A. M. Schmalz was elected president of the group, Matt Keller and Reinhold Lutzow, vice-presidents, and William Voie was reappointed secretary.

Meet Demand for Waterproof Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Dec. 22, 1943—One of the most serious problems confronting the WPB Paper Division and the paper-making industry, is to meet the demands of the Army for waterproof wrapping paper, when kraft paper and unbleached sulphate pulp, from which it is made, is so short, G. E. McCorison, Chief of the Waterproof Paper and Gummed Tape Section of the Paper Division, said today.

This problem was laid before the Waterproof Paper Industry Advisory Committee by Mr. McCorison, Government Presiding Officer. The requirements for waterproof papers have expanded rapidly during the recent months due to the enlarged program for overseas shipments of military supplies and the development of many new vital war uses for these asphalt laminated papers.

The advisory committee members present included the following: Arthur M. Anderson, Sisalkraft Company, Chicago, Ill.; J. F. Doyle, Arkell Safety Bag Company, New York, New York; S. A. Feely, Keystone Roofing Company, York, Pa.; J. D. Griffin, Scutan Division, Union Bag and Paper Company, Hudson Falls, N. Y.; Fred P. Wood, Simplex Paper Company, Adrian, Mich., and J. D. Young, Edgewater Paper Company, Menasha, Wis. They represented six mills out of a total of 28 U. S. mills manufacturing waterproof wrapping paper.

In order to have studies made of important phases of pending problems, Mr. McCorison designated three task committees: one to study the scheduling of production according to essentiality, another to work on conservation and technical matters, and a third to investigate material requirements involving the industry. These three committees will report by January 5, and meet as a full committee again on January 20, Mr. McCorison stated.

Several government experts, including Robert Porter, WPB Procurement Policy Division; Julius Trefz, attorney, Paper and Paperboard Divisions; G. Ray Davisson, Industry Advisory Committees Division; Major F. H. Whitehouse; Captain C. E. Shultz, and Lieutenant K. S. Campbell of the Army; Jean Zeller of the Paper and Textile Bag Section, Containers Division; E. R. Metcalf, Hard Fibre Section, Textile Division; D. C. Arnold, Asphalt Section, Petroleum Administration for War; and O. B. King, Kraft Section, Paper Division, reviewed specific angles of the wrapping and waterproof paper problems, and discussed availability of basic materials or their substitutes.

Price for New Weight Newsprint

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 22, 1943—During a four-month experimental period new light weights of newsprint paper may be priced by the addition of the extra production costs to ceilings for standard newsprint paper, the Office of Price Administration announced today.

This differential may be applied from December 1, 1943, to March 31, 1944, inclusive.

As a means of conserving further the short available supply of wood fiber, the War Production Board has recommended the experimental production of newsprint in lighter than standard weight.

Because this light weight newsprint has not generally been produced before, and information is unavailable as to average increased costs involved, OPA will permit the temporary differential to be determined by individual negotiation between each seller and purchaser. The differential charged, however, must not exceed the estimated increased cost to the manufacturer, computed in accordance with his customary accounting methods.

Manufacturers are required to send OPA monthly reports of their costs for the light weight newsprint produced as well as for the standard weight newsprint produced by them during the same period. OPA anticipates that by April 1, 1944, it will be possible to determine a fixed differential for use by all manufacturers.

The new differential may be applied on newsprint made on order to weigh less than 31 lbs. for 500 sheets measuring 24 by 36 inches. Standard newsprint paper is customarily made in 32 lb. average basis weight, with only occasional variations from that weight.

The action is taken in Amendment No. 5 to Revised Maximum Price Regulation No. 130 (Newsprint Paper) effective December 16, 1943.

William S. Fowler Resigns

William S. Fowler has resigned as art director and sales manager of the Hampden Glazed Paper and Card Co., Holyoke, Mass. Graduating from Yale "Sheff" in 1914 he first entered the employ of the Valley Paper Co. of Holyoke, where he learned the art of paper making the hard way. After about two years he was appointed purchasing agent and assistant treasurer, and supervised a reorganization of the company that took place at that time. He remained in these capacities until he left to serve as ambulance driver with the American Field Service in World War I.

Returning after a year and a half at the front, he remained with the Valley as assistant manager. Later on he became part owner and general manager of a paper mill in Windsor Locks which manufactured tissue and toweling products. At this time he became interested in the development of cotton linters, as pulp for fine papers. He joined a new pulp mill in West Virginia, which was one of the first to promote the use of cotton linters for use in the making of paper.

After several years he sold out his paper mill interests and accepted a position as advertising manager with a well known paper converter of Holyoke, the Hampden Glazed Paper and Card Company. Here for more than twenty years he has served in several capacities and has found a wide outlet for his creative abilities. During the first few years his company having joined the Paper Makers Advertising Association, he became treasurer of the association. For the next 12 years he was an executive officer and through his leadership while president, the association grew in membership to the highest peak it ever reached, before or since.

In 1934 he joined the sales force of the Hampden Glazed Paper and Card Company as salesman in charge of laminated covers and boards, and in 1938 was promoted to general sales manager, which position he has held till now.

As yet he has not fully formulated his plans for the future.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending December 18, 1943

STOCKS

	High	Low	Last
A. P. W.	2	2	2
Armstrong Cork Co.	38¼	36	38¼
Celotex Corp.	11⅜	11⅛	11⅛
Celotex Corp., pf.	17⅜	17	17
Certain-Teed Products Corp.	5¼	4⅞	4⅞
Certin-Teed Products Corp., pf.	61	59	59¾
Champion Paper & Fibre Co.	19⅞	19	19⅛
Champion Paper & Fibre Co., pf.	109	108	108
Congoleum Nairn Co.	22½	22⅛	22⅛
Container Corp. of America	20¼	19⅞	19⅞
Continental-Diamond Fibre Co.	11¾	11	11¼
Crown-Zellerbach Co.	15⅞	15	15⅛
Crown-Zellerbach Co., pf.	97	96	97
Dixie Cup Co.	14⅝	14⅛	14⅝
Dixie Cup Co.—A	43⅞	43	43⅝
Flintkote Co.	19⅛	18⅝	19⅛
Flintkote Co., pf.	107	107	107
Robert Gair	3	2¾	2¾
Robert Gair, pf.	12½	12¾	12½
International Paper Co.	14⅜	13⅞	14⅛
International Paper Co., pf.	68	66	68
Johns-Manville Corp.	88¼	86	87
Johns-Manville Corp., pf.	126	125	126
Kimberly-Clark Corp.	31	30½	30½
MacAndrews & Forbes	25¾	25	25¾
MacAndrews & Forbes, pf.	138	138	138
Masonite Corp.	38¼	37⅝	38¼
Mead Corp.	8⅜	8⅛	8⅛
Mead Corp., pf. A—6%	....	....	....
Mead Corp., pf. B—5½%	68½	68½	68½
National Container Corp.	12¾	11⅜	11¾
Paraffine Companies, Inc.	44	43½	44
Paraffine Companies, Inc., pf.	104½	104½	104½
Rayonier, Inc.	13⅜	12⅞	13¼
Rayonier, Inc., pf.	29½	28½	28¾
Ruberoid Co.	25¼	24⅜	24⅜
Scott Paper Co.	37⅜	36¾	37⅜
Scott Paper Co., pf.	107½	105	107½
Sutherland Paper Co.	30½	30½	30½
Union Bag & Paper Corp.	10¼	9¾	10
United Paperboard Co.	4½	4⅜	4½
U. S. Gypsum Co.	72	69½	72
U. S. Gypsum Co., pf.	170	168	168
West Virginia Pulp & Paper Co.	16¼	15¾	16⅛
West Virginia Pulp & Paper Co., pf.	106½	106½	106½

BONDS

Abitibi Pulp & Paper Co., 5s '53	....	....	....
Celotex Corp. 3¾s '55	102	101¾	102
Certain-Teed Products Corp. 5½s '48	100½	100	100½
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	107	106½	107
International Paper Co. 5s '47	105	104¾	105
Mead Corp. 3½s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending December 18, 1943

STOCKS

	High	Low	Last
American Box Board Co.	7¼	6¾	7⅛
Brown Co., pf.	....	....	....
Great Northern Paper Co.	30	28½	28¾
Hummel-Ross Fibre Corp.	4	4	4
St. Regis Paper Co.	4	3¾	4
St. Regis Paper Co., pf.	147¾	138¾	147¾
Taggart Corp.	5¼	4⅞	5

BONDS

American Writing Paper Co. 6s '61	100	99¾	100

Glens Falls Plug Works Sold

GLENS FALLS, N. Y., December 15, 1943—Sales of the Glens Falls Plug Works on the Dixon Road, at Halfway Brook, operated for 51 years by the late Jabez N. Ingalsbe, to the Adirondack Core and Plug Works of Carthage has been announced. The new owner is continuing to operate the plant, one of the few of its kind in this section of the country.

The property consists of about six acres of land and a number of buildings. Mr. Ingalsbe, who died October 2, started the mill in 1892 with his brother, Paul, and their father, manufacturing wooden plugs for the Allen Brothers' paper mill at Hudson Falls (then Sandy Hill). The Ingalsbe plant is 100 per cent Diesel operated, the late Mr. Ingalsbe having introduced the first Diesel engine in this vicinity.

The property was sold by Miss Edith M. Ingalsbe, as executrix of her brother's estate. She was represented in the negotiations by Attorney Walter A. Chambers. George C. Whaling of the Adirondack Core and Plug Works represented the Carthage firm.

Sues for Social Security Tax

A suit brought by the Bedford Pulp and Paper Company, Richmond, Va., against N. B. Early, Jr., Collector of Internal Revenue, to recover over $1,180 in Social Security taxes paid by the company was heard in Federal District Court before Judge Robert N. Pollard.

The company is asking the refund on the grounds that the cutters, loaders and truckers for whom the taxes were paid are not directly employed by the company. Such workers, company representatives testified, are hired by independent contractors with whom the company negotiates.

West Virginia Nets $1.86

The West Virginia Pulp and Paper Company and subsidiaries for the fiscal year ended October 31, reports sales of $53,715,051, compared with $52,814,029 a year ago; net income $2,610,496 after taxes and charges, equal after preferred dividends to $1.86 a share on 902,432 common shares; year ago $2,789,248 and $2.05 a share. Cash $7,615,087, compared with $6,988,674; marketable securities $7,828,153, compared with $4,206,909; inventories $7,360,995, compared with $9,497,619; receivables $5,647,060, compared with $4,461,502; current liabilities $8,212,281, compared with $6,041,735.

Masonite Corp. Earns $282,555

The Masonite Corporation reports as follows for the quarter to November 30: Net profit, $282,555, equal to 45 cents each on 539,210 shares of common stock after preferred dividend requirements. This compares with $346,584, or 57 cents a common share, for November quarter of 1942. Sales totaled $4,701,263, against $4,693,432.

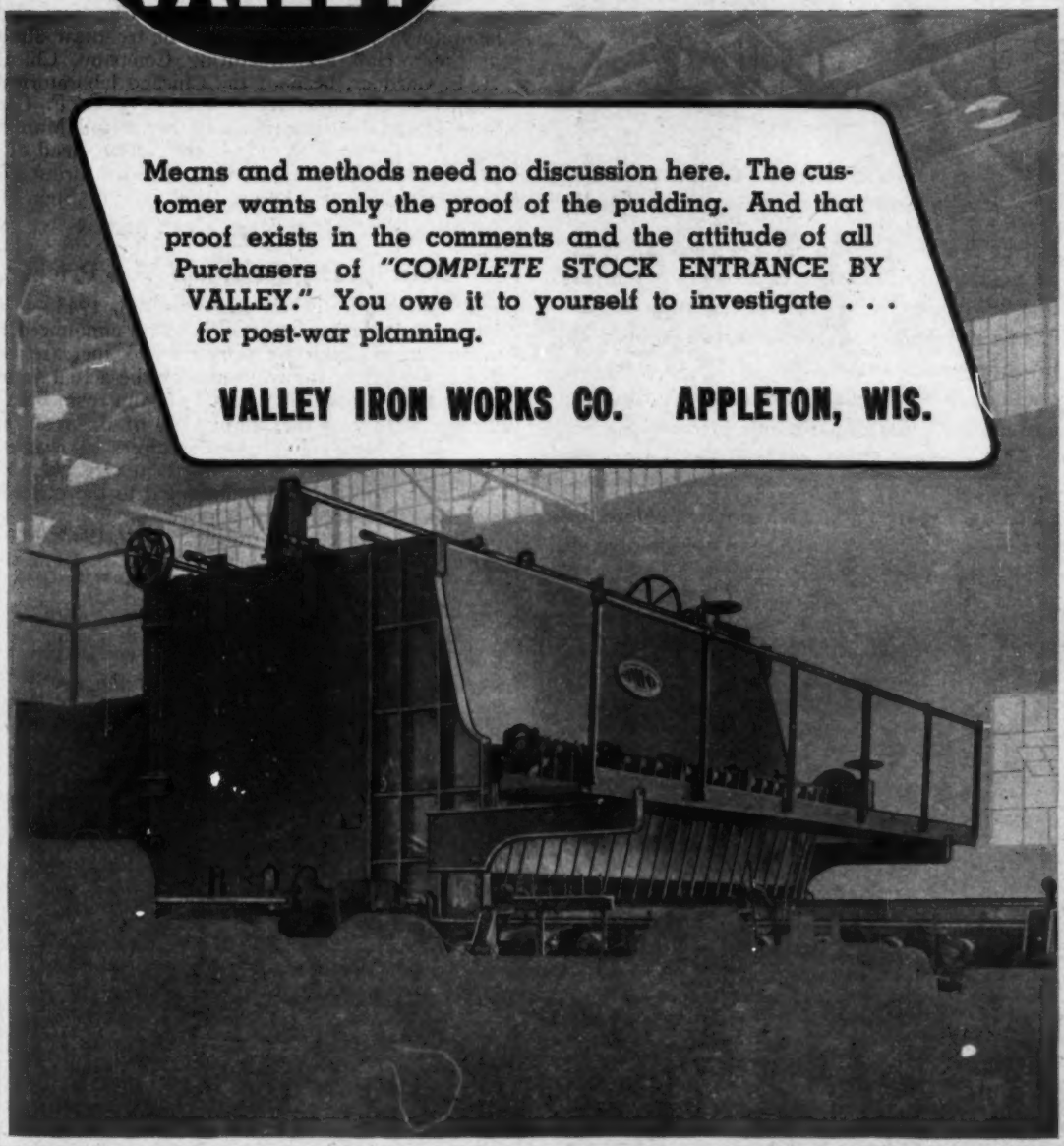
Nekoosa-Edwards to Pay

Stockholders of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., will receive a dividend of $1.00 per share on the capital stock on December 30, according to announcement of John E. Alexander, president. It will be paid to all stockholders of record December 20.

St. Regis Makes Offer for Taggart Stock

The St. Regis Paper Company has offered to purchase all or any part of the outstanding common shares of Taggart Corporation at $5 a share, according to notice received by the Curb Exchange. The offer expires at the close, December 31.

ANOTHER
EXAMPLE OF
Complete
Stock Entrance
BY
VALLEY



Means and methods need no discussion here. The customer wants only the proof of the pudding. And that proof exists in the comments and the attitude of all Purchasers of *"COMPLETE* STOCK ENTRANCE BY VALLEY." You owe it to yourself to investigate . . . for post-war planning.

VALLEY IRON WORKS CO. APPLETON, WIS.

We trust that there is a connection between this policy and the facts that follow:

During the last decade our floor space has increased 36%. Stretcher capacity has jumped 83.69% since 1935. Our engineering department originates many devices to heighten efficiency which materialize swiftly in our machine shop. Close supervision in wire drawing and diamond die departments promote the accurate, uniform sizing of Lindsay Fourdrinier wires. Laboratory activity is growing rapidly. Sufficient expansion had taken place before the war began so that we have been able to give all our attention to production.

THE LINDSAY WIRE WEAVING COMPANY
Serving the Paper Industry Since 1903
14001-14299 ASPINWALL AVE., CLEVELAND 10, OHIO

Lindsay WIRES
FOR PAPER MILLS

Stein, Hall Hold Chemist Conference

Stein, Hall & Co., Inc., manufacturers and distributors of starches, gums, dextrines and specialty products to various industries since 1866, recently held a Chemists' Conference at its main offices, 285 Madison Avenue, New York. About 40 chemists from Stein-Hall's textile, food, paper, adhesive and research laboratories throughout the country participated in the discussions.

The research and development work done in textiles, paper, food and adhesives during the past year was reviewed, and plans were laid for the projects to be concentrated on during the coming year, particularly from the viewpoint of the post-war picture.

The sessions were under the directions of Dr. Alexander Frieden, technical director of the Stein-Hall organizations. Among those present were: G. V. Caesar, head of the New York laboratory; F. G. LaPiana, head of the Providence textile laboratory; T. G. Heiser, head of the Long Island City laboratory; D. E. Truax, head of the Charlotte textile laboratory; J. V. Bauer, assistant technical director of Stein-Hall Manufacturing Company, Chicago; H. F. Gardner, head of the Chicago laboratories of Stein-Hall Manufacturing Company; E. F. Glabe, head of the food laboratory of Stein-Hall Manufacturing Company, Chicago; H. E. Nelson, head of the paper laboratory of Stein-Hall Manufacturing Company, Chicago; E. Percy, head of the Stein-Hall, Ltd., Canada laboratory.

Permits Higher Rosin Size Prices

WASHINGTON, D. C., December 23, 1943 — The Office of Price Administration today announced that manufacturers will be permitted to increase their maximum prices for rosin size by the actual amount of increase in acquisition costs of gum rosin between March, 1942, and the selling date of the rosin size.

Under today's action, manufacturers' allowable increase in maximum prices of rosin size containing gum rosin will be an amount equal to the difference between the current market price for gum rosin and the highest market price during March, 1942. Market price is defined as the price quoted for gum rosin on the Savannah, Georgia, Cotton and Naval Stores Exchange for deliveries at Savannah.

The maximum price per hundred pounds for a sale by a manufacturer of rosin size shall be the maximum price established without the use of this section 4.17, plus an amount equal to the difference between the current market price and the highest market price during March, 1942, per hundred pounds of the grade of gum rosin contained in the rosin size being priced multiplied by the percentage of such gum rosin specified by the applicable formula as contained in such rosin size. The actual percentage of such gum rosin per 100 pounds of such rosin size which is delivered shall not vary more than three percent from the percentage specified by the formula.

Heads Whitney Anderson Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

SPRINGFIELD, Mass., December 20, 1943 — The Whitney Anderson Paper Company, Inc., will be operated under the presidency of Richard B. Anderson as of January 1, 1944. The board of directors deeply regret the resignation of John R. Whitney as president.

Indiana Section Active

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., December 20, 1943—If it were not for the enormous demand from war services and defense industries, there might be an improvement in paper supplies in this territory. Production of paper and paper products in the Indiana section has improved considerably, but demand from war sources has kept supplies for civilian uses to a low point. Demand from civilian sources continued heavy last week.

Wrapping paper and bags were in heavy demand due to the heavy Christmas buying. Thus far there has been no actual shortage, but stocks in this section are not heavy.

Newsprint demand continued fair last week, with linage up because of holiday advertising. Thus far there does not appear to be much effort on the part of large publishers to condense their news columns. Much space continues to be given to "boiler plate" columnist comments, comics and similar features. If any saving in space is made, it seems to be in the curtailment of local news.

The situation in building paper and roofing is little changed. Good weather has kept the demand about what it was during most of the fall, but after the first of the year, demand is expected to drop drastically. Nor is there any hope that restrictions in construction will be alleviated during the next year. Inventories in wholesale hands will be lighter this year-end.

Mill demand for waste paper last week was heavy. Local supplies were somewhat heavier and the public finally seems to be coming to a realization of the fact that collection of waste paper is vital and there is a readier response to publicity than there has been. Ceiling prices were in effect last week. The rag demand also was heavy last week with most items being wanted. Prices were at ceiling levels.

Pulp for New Zealand

Imports of woodpulp into New Zealand during June 1943 were valued at £24,986, as compared with £12,181 for the same month of the previous year, according to a report to the Department of Commerce. Newsprint imports during June, 1943 were valued at £83,251, more than ten times the value of newsprint imported during June last year. Value of other paper imports increased from £282,953 in June, 1942, to £579,581 in June, 1943.

"The little man who isn't there"
is any super's jinx —
The "Absentee," between you and me, confidentially, he . . . thinks
He gets away with something. But he really doesn't, for
He hurts himself and hurts production, hurts the mill, prolongs the war.
The only mill where absentees don't hurt production any
Is one whose spare hand hasn't only one spare hand, but *many!*
They got him from a circus where he used to be a freak.
A one-man crew, he's earning now two hundred bucks a week.

Is absenteeism a problem with you? Much has been done in the "big-stick-waving" school of thought; here's a mild, sugar-coated shot at the same thing. You may wish to clip the sketch and verse and put them upon the mill bulletin board. If you're on Cheney Bigelow's mailing list, you'll be getting this in poster form.

CHENEY BIGELOW

Fourdrinier Wires · · Dandys · · Cylinders · · Wire Cloth

CHENEY BIGELOW WIRE WORKS · 417 LIBERTY STREET · SPRINGFIELD, MASS.

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Vol. 117 December 23, 1943 No. 26

COMING EVENTS IN PAPER INDUSTRY

American Paper and Pulp Association, Sixty-seventh Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 14-18.

Technical Association of the Pulp and Paper Industry, Convention, Commodore Hotel, New York, February 14-17.

National Paper Trade Association of the United States, Convention, Waldorf-Astoria Hotel, New York, February 14-17.

The New York Association Of Dealers In Paper Mills' Supplies, Annual Banquet, Commodore Hotel, New York, Tuesday, February 15.

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

LOOKING AHEAD

Major wars create great problems in the production and distribution of supplies for every person. Difficult as a war economy is to establish and effectively maintain, the conversion of this great productive energy to fulfill the constructive demands of peace is even a more gigantic task. One reason why post-war planning seems so huge a national effort is because of the employment problem. During the war almost every employable person can get work at the highest rates in industrial history. But when peace comes all nations will have a heavy burden of debt and with high taxes it will be difficult for the United States to "get going." With an allied victory certain most far-sighted business men are looking ahead for the resumption of normal business operations. It may not, probably will not mean that a peace-time economy will take up where it was left off. It will require a new start with all the familiar tools and plenty of opportunity to make good use of all the inventive and productive genius with which our country is so liberally supplied.

The peak of war production is past, Henry J. Kaiser said last week. "So great is this country's productive capacity that the peak of our war materials production is past before we have hardly begun to fight," the industrialist stated. "While there still is necessity for sustained production, the urgent problem is to provide for the future, right now. It is not only the time now, but already too late to begin building the peace-time economic structure of the United States. We have tripled the nation's business volume during this war. We have reduced by three or four times the amount of credit necessary to do business. That's because we have only one customer, the Government. It buys everything and it pays every week. Manufacturers are going to have to prepare to substitute the people for the Government as their customer. The people won't pay in full every week for every article purchased. Preparation must be made, therefore, for credit upon which to meet payrolls and operate business and for resumption of installment buying."

The answer, Mr. Kaiser said, was a "risk credit pool, in which the banks, investment trusts, insurance companies, the Government and labor unions must invest billions. The labor unions, too, since they are solidly organized, have a solid responsibility to the country as well as to the workers, and are not entitled merely to sit down and ask the industrialists what they are going to do about the future economic crises. The banks must organize this pool. It would be available to everybody, the small manufacturer, the small business man as easily as to the great concerns already existing. After credit is furnished comes the creative mind, the inventors and the planners, the two or three hundred thousand engineers of this country. Then the builders, the men who make plans into reality. Then the distributors and the sellers."

Planned cooperation is essential, Mr. Kaiser declared, in part as follows. "The question is whether there will be cooperation between labor, management, agriculture and government with a principal theme of efficiency, the most produced for the lowest man-days of full productive energy. If we don't insure that cooperation by joint planning now, we run the danger of seeing our people divided into pressure groups when the war ends, each seeking temporary and artificial gains by force at the expense of the other."

In commenting on prospects for 1944, Henry H. Heimann, executive manager-on-leave of the National Association of Credit Men, said in his business letter of December, in part as follows: "Nothing would do more to insure a real post-war prosperity and full employment than to have labor and industrial leadership meet in conference to compose their differences and agree upon a common objective, one fair to labor, ownership, management and particularly the public. No sound labor leader wants to see industry destroyed and only the exceptional, reactionary industrialist now disputes labor's right to organize. The nation's welfare demands a more common agreement. And unless it can be reached in friendly conference between the parties, the year 1944 will set the stage for real chaos. This is the most important problem we face in the year ahead. If it is solved, America will again move forward. If it remains unsolved, our future is uncertain."

There will be credit in abundance for the deserving, Mr. Heimann said and went on to say that, "This includes credit for individuals and business. The interest rates will be favorable. Consumers' and farmers' balance sheets are in excellent condition

for credit acceptance. If industry is given a fair termination policy and the government adopts a sound renegotiation program and handles its surplus products in a sensible way, the credit situation should be focussed upon our national government. The federal government will have to justify every dollar of credit — one of the healthiest fiscal signs on the financial horizon of next year."

May Establish Branch at Prescott

[FROM OUR REGULAR CORRESPONDENT]

OGDENSBURG, N. Y., December 18, 1943 — Announcement is made here that the Cleveland Container Company plans to establish a branch at Prescott, Canada, in the near future if a desirable site can be located. The company manufactures paper containers and hopes to open the Canadian market from here in the post-war period. It also believes that now is the time to map out a dominion market if production is to be continued without slackening after the war. War materials are now being produced mainly but production may be hampered after the war unless another market is available. F. W. Walker, president, and Francis B. Burns, superintendent, went to Ottawa this week to confer with Col. Henry Bankhead, of the U. S. embassy regarding tariffs on paper products entering Canada. Tariffs on manufactured paper articles entering Canada are now prohibitive and local civic leaders have been urged to do all in their power to lower the tariffs to the point where containers manufactured here could be shipped to that country. The Canadian government has adopted the high tariff schedule in order to protect its own budding paper manufacturing industry.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1943		Corresponding Weeks—1942	
November 6	90.6	November 7	88.5
November 13	89.4	November 14	89.7
November 20	91.0	November 21	86.9
November 27	89.8	November 28	82.3
December 4	91.7	December 5	84.9
December 11	89.6	December 12	88.4

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8
1943	87.2	88.9	89.5	88.7	91.4	86.4	84.4

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1942	80.8	82.8	90.6	86.9	80.1	90.4
1943	91.1	88.3	90.2	90.6	....	....

COMPARATIVE YEARLY SUMMARIES

	1936	1937	1938	1939	1940	1941	1942	1943
Year to Date	80.3	81.6	71.5	83.1	86.0	97.4	91.3	88.8
Year Average	80.4	79.8	71.5	83.4	85.6	97.4	90.4	....

*Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	68	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	94	96	94	89	96	94	94	93	..	..

Week ending Nov. 6, 1943—93
Week ending Nov. 13, 1943—95
Week ending Nov. 20, 1943—94
Week ending Nov. 27, 1943—91
Week ending Dec. 4, 1943—95
Week ending Dec. 11, 1943—96

†Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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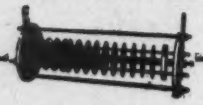

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Study showed that resistance to corrosion . . . and especially to pitting and scaling . . . is a property of certain alloys high in chromium and nickel content. Tests with Inconel (approx. 80% Nickel, 13% Chromium) supported this view:

Laboratory Corrosion Tests in Vacuum Distillation of Crude Tall Oil Recovered from Kraft Pulp.*

Temperature—560° F.—590° F.
Vacuum—7 mm. mercury
Duration of Test—72 hours

	Average Corrosion Rates		
Material	*Inch Penetration Per Yr.*	*Scaling*	*Pitting*
Inconel	0.0022	None	None
Nickel	0.0047	Slight	Slight
Monel	0.0081	Slight	Slight
Cast Iron....	0.44	Yes	Yes

On the basis of this and similar tests, Inconel was used in tall oil distillation equipment. Five years of working experience have proved this INCO Nickel Alloy outstanding for this service.

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**From "Corrosion Characteristics of the Distillation of Tallol" F. C. Vilbrand and L. E. Ward Jr., Transactions of the Electrochemical Society, Vol. LXXIII (1938 pp 111-126.)*

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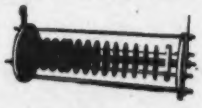

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Viscosity and Molecular Weight

II. Depolymerization during Delignification

By S. Coppick[1]

Abstract

A method is given which enables one to follow the depolymerization of the carbohydrate constituent of wood at various stages of delignification. Lignified tissues are nitrated, and the cellulose nitrate is isolated from the reaction product. Its chain length is then evaluated viscometrically.

The depolymerization of cellulose is followed during a series of sulphate and soda cooks as well as during chlorine dioxide and Cross and Bevan delignifications.

The commercial delignification of woody tissues for the production of purified cellulose is based upon the relative reaction rates of lignin and cellulose. In practice, conditions are chosen to give optimum reaction activity on the lignin encrustant without excessive degradation of the carbohydrate constituent of the wood.

The velocity of delignification has received considerable attention; and a great deal of research has been reported wherein cooking cycle, digestion medium, temperature, and pressure have been thoroughly investigated during the last 20 years. Similar attention has been given to both the rates of delignification and degradation in the bleaching process of pulp purification. Here, the lignin content, permanganate number, bleach consumption, and viscosity are readily interpreted to evaluate the velocities of the two reactions.

However, in the pulping stage of delignification little has been reported regarding the rate of depolymerization of the carbohydrate. This results from the difficulty experienced in the measurement of the chain length of the cellulose constituent in raw pulps. Investigators usually have been content to determine the "overall" degradation by a viscosity measurement at the end of the cook.

The difficulty arises due to the poor solution tendency of lignified tissue in cellulose solvents. Lewis *(2, 14)* has demonstrated the presence of a fiber coating which is insoluble in cuprammonium solution. Even after a treatment for fifteen hours with cuprammonium solvent, Rubens *(15)* has shown that in the case of high-lignin pulps there remains many only partially dissolved fibers. However, in experiments *(13)* conducted in this laboratory, it has been shown that lignin will dissolve to some extent in cuprammonium solution if the plant tissue is first subjected to mechanical gelatinization.

To increase the solubility of raw pulps, Rubens *(15)* has advocated the use of lower cellulose concentrations in the solvent. He recommends reducing the concentration from 1 to 0.5% pulp in cuprammonium solvent. We have found that this procedure has no appreciable effect on the extremely poor dispersions formed with pulps containing greater than 10% lignin.

The solvent power of cuprammonium solution may be improved by increasing the copper and ammonia concentrations in the solvent as used by Van Beckum and Ritter *(21)* in the dispersion of holocellulose. With raw pulps we find that this has no great effect on the amount of material dissolved.

The grinding of pulp in a Kroner mill has been advised as being helpful in aiding the dispersion of the pulp in cuprammonium solution, but this method suffers from the disadvantage that the cellulose then tends to gelatinize in the solvent.

With the recent developments in the use of cupric ethylenediamine *(3, 7, 18, 19)* as a rapid solvent for cellulose, it has been ardently hoped that this more powerful dispersing agent would serve for raw pulps. In our experiments, however, we find little if any advantage over cuprammonium for cases where the lignin content is greater than 10%.

In previous communications *(4, 5, 10)* we have shown that woody tissues may be nitrated directly irrespective of their state of delignification. Under suitable conditions of nitration, a product is obtained which is almost completely soluble in various organic solvents such as acetone. The product contains, along with the cellulose nitrate, large amounts of the nitrated hemicellulose content of the original wood together with considerable quantities of the nitrated and oxidized ligneous products. The yield is hence very high. We have further shown that this heterogeneous nitrate is readily fractionated into its components by extraction or precipitation processes.

On extraction of the crude nitrated woody products with ethyl alcohol we have obtained a material

[1] Member of TAPPI; Acting Professor of Forest Chemistry, Pulp and Paper Department, New York State College of Forestry, Syracuse, N. Y.

which is composed almost entirely of carbohydrate nitrate. The small amount of only partially reacted material present in the extracted nitrate may be removed by dissolving in acetone, centrifuging, and then reprecipitating the clear solution into water. Substantially the whole of the cellulose constituent of the wood is recovered as the nitrate, practically free from encrustants and readily soluble in simple organic solvents.

These experiments have provided a method, whereby, irrespective of the lignin content, we may isolate the carbohydrate of a raw pulp in the form of its nitrate. Viscosity measurements on this nitrate should be indicative of the degree of polymerization in the original pulp *(5)*. These considerations have been applied in efforts to follow depolymerization during delignification by various reagents.

Wood and Its Preparation

Several series of partially delignified woody tissues were used in this investigation. These consisted of various degrees of delignification in groundwood pulps and wood meal. The groundwood pulps were eastern white pine *(Pinus strobus* L.) and aspen *(Populus sp.)*. The preparation of these mechanical pulps has been described by Jahn and Holmberg *(11)*.

The white pine groundwood was delignified by two processes. In one series a number of cooks were performed in a sulphate digestion medium. The different lignin contents were obtained by varying the cooking time. In another series, delignification was accomplished by treatment with chlorine dioxide in aqueous pyridine. The extent of the delignification was controlled by varying the time and amount of available oxidizing agent. These reactions were carried out following the procedures of Schmidt, Tang, and Jandebeur *(16)*.

The aspen mechanical pulp was delignified by soda cooking for various periods of time. Both the delignifications of the white pine and aspen were carried out by C. V. Holmberg and the procedures have been reported in detail *(11)*.

The wood meal used was aspen *(Populus sp.)*. This material was ground in a Wiley mill and screened. The fraction retained for delignification was the 60- to 80-mesh portion. This fraction was extracted with alcohol-benzene *(20)*, and air dried. The wood was then delignified by a modification of the Cross and Bevan *(6)* procedure. Approximately 5 grams of the wood meal was suspended in 500 ml. of water and chlorine gas passed in at a rapid rate. The chlorination was continued at 25° C. for 7 minutes. After chlorination the suspension was filtered, washed with 1% sulphurous acid, and then with water. The product was digested for 30 minutes at 100° C. with freshly prepared 3% sodium sulphite, filtered, washed with water, and then digested for 30 minutes in boiling water. The chlorination and digestion processes were repeated to give the required extents of delignification. At the end of four chlorinations the lignin was entirely removed.

The air-dry products from all of these delignification series were nitrated in a medium prepared by mixing 204 ml. of concentrated sulphuric acid (sp. g. 1.84) with 88 ml. of concentrated nitric acid (sp. g. 1.415). The acid mixture was cooled to 10° C. and 50 ml. added rapidly to 2 grams of the woody tissues with rapid stirring. The nitration was allowed to proceed for 5.5 hours at 25° C. At the end of the nitration period, the suspension was filtered and the product was immersed with rapid stirring into 500 ml. of cold water. The products were then thoroughly washed with cold water until free from acid and finally air dried. The nitrates were extracted in a Soxhlet apparatus for 10 hours with alcohol then air dried.

TABLE I.—SULPHATE DIGESTIONS OF WHITE PINE GROUNDWOOD

Yield [1] %	Lignin [1] %	Relative Viscosity Apparent	Relative Viscosity Actual	$\ln \eta_r$ c	[η]	D. P.	Molecular Weight
100.0	27.4	10.1	19.2	10.4	11.9	3220	855,000
66.5	23.7	7.2	8.6	7.6	8.7	2350	623,000
64.5	20.4	7.8	8.7	7.6	8.7	2350	623,000
58.5	16.7	5.4	7.6	7.0	8.0	2160	573,000
52.4	11.1	5.1	5.9	6.2	7.7	2080	552,000
46.6	6.5	4.0	4.3	5.1	5.8	1560	414,000
48.8	4.5	3.8	3.8	4.7	5.4	1460	387,000
43.2	3.0	3.4	3.8	4.7	5.4	1460	387,000
Chlorine Dioxide Delignification of White Pine Groundwood							
100.0	27.4	10.1	19.2	10.3	11.7	3160	837,000
91.3	25.6	12.5	18.5	10.2	11.6	3130	830,000
94.2	17.5	21.4	30.9	12.0	13.7	3700	980,000
70.8	7.7	15.8	18.4	10.2	11.6	3130	830,000
71.2	1.7	9.0	9.7	7.9	9.0	2430	645,000
Soda Cooking of Aspen Groundwood							
100.0	20.0	10.1	14.1	9.3	10.3	2780	736,000
73.0	15.0	8.9	10.4	8.2	9.4	2540	674,000
64.7	8.9	6.4	6.5	6.5	7.4	2000	530,000
58.7	6.6	5.6	5.7	6.1	7.0	1890	501,000
51.7	1.8	3.3	3.5	4.4	5.0	1350	358,000
Cross and Bevan Delignifications of Aspen Wood Meal							
Chlorinations							
0		29.6	58.4	14.2	16.2	4370	1,160,000
1		31.4	62.9	14.5	16.5	4460	1,180,000
2		47.9	42.8	13.1	14.9	4030	1,065,000
3		19.9	20.2	10.5	12.0	3240	860,000
4		14.6	12.5	8.9	10.1	2730	723,000
Dewaxed Cotton							
..		84.5	...	15.5	17.7	4780	1,260,000

[1] Determined by C. V. Holmberg *(11)*.

For the determination of the "apparent" viscosity of the product, an amount of the extracted material equivalent to 0.1 gram of moisture-free nitrate, was placed in a test tube together with 10 ml. of alcohol-benzene (1:2 by volume). Then 25 ml. of acetone was added, and the suspension was shaken from time to time over a period of several days. On settling out of the small amount of insoluble material, the clear supernatent solution was decanted off and its viscosity determined in an Ostwald pipet.

The "actual" values for the viscosities of the carbohydrate nitrate present in these products was determined on the nitrate from which the small amount of insoluble residue had been removed. The nitrates (0.5 grams) were wetted with 5 ml. of alcohol-benzene (1:2 by volume), then 200 ml. of acetone were added. Upon shaking at various intervals over a period of several days the material was thoroughly extracted with the solvent. The small amount of insoluble material was removed by centrifuging, and 100 ml. of the clear solution was precipitated by pouring into 500 ml. of cold water. The products were filtered and air dried. Viscosities were determined for this material in the mixed solvents as described above.

Raw cotton was dewaxed and nitrated as described in a previous paper *(4)* and its viscosity determined as with the nitrated pulps.

Degrees of Delignification

The results are given in Table I for the various degrees of delignification obtained by different cooking methods. By the relative viscosities we mean the viscosity of a solution composed of 2.83 grams of material per liter of solvent expressed as a ratio to the viscosity of the solvent.

It appears that these viscosities are practically the same for pulps of low lignin content irrespective of whether one measures the apparent or actual values. The small amount of unreacted lignin-carbohydrate complex is therefore essentially absent in the well-cooked pulps. This condition prevails for lignin contents of less than 10%.

However, in cases where the delignification has not proceeded to encrustant values below 10%, the apparent relative viscosities are considerably lower than the actual values. The only partially reacted and hence insoluble material is present in appreciable amounts and must be removed before trustworthy values for the viscosity of the carbohydrate may be obtained.

In Table I the intrinsic viscosity function is given for the nitrated pulps with various degrees of delignification. This function is expressed as the ratio of the natural logarithm of the actual relative viscosity to the concentration expressed in grams of solute per 100 ml. of solvent. This is further converted to the intrinsic viscosities at infinite dilution by the formula:

$$[\eta] = \frac{\ln \eta r}{C} (1 + 0.5c)$$

which we have developed and reported in a previous paper *(4)*.

The infinite dilution values have been converted to the degree of polymerization (D. P.) by use of Kraemer's equation *(12)*:

$$\text{D. P.} = 270\ [\eta]$$

The molecular weight is given by:

$$M = 265\ (\text{D. P.})$$

where 265 is the weight of the repeating unit of nitrated glucose anhydride as calculated from the nitrogen content of these materials.

Conclusions

The conclusions which may be drawn from the results of this work are summarized by an analysis of Fig. 1. In the case of soda and sulphate cooking, depolymerization of the carbohydrate takes place continuously and uniformly during delignification. With the chlorine dioxide delignification it appears that depolymerization is preceded by fractional solution of the short chain carbohydrate. This results in an increase in the average chain length of the residual cellulose which is further depolymerized as delignification proceeds. Similar effects have been reported by Atchison *(1)*. The same type of phenomenon is observed with the Cross and Bevan purifications (Table I).

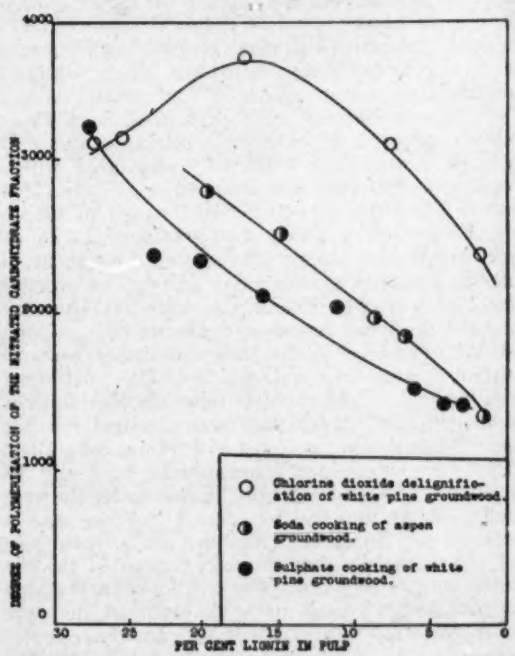

FIG. 1

The Depolymerization of Cellulose During Its Isolation by Different Delignification Methods

The total degradation in chlorine dioxide pulping is considerably less than that found for soda or sulphate delignification, and with the chlorine treatments followed by sulphite digestions the "overall" degradation is midway between that found for the chlorine dioxide and the pressure cooks.

It also appears that considerable depolymerization takes place in the hot grinding operation of mechanical pulping. In both aspen and white pine the chain length of the carbohydrate in wood meal was found to be much greater than the corresponding values for the mechanical pulps.

The chain length of the carbohydrate as it exists in wood appears to approach that of raw cotton. The nitrate of the polysaccharide fraction from aspen wood meal has a degree of polymerization of 4370 while similarly treated cotton has a value of 4780.

All of our chain length values are somewhat higher than those reported by other workers in the field *(1, 12, 17)*. We do not mean to infer that those values which we have reported are the actual average lengths of the molecules as they occur in the native tissue, but we wish to propose them as minimum values.

The nitration conditions which we have used are not inert to the polysaccharide but their degradative action is slight. Possibly with the use of phosphoric acid in the nitrating bath in place of sulphuric acid, even higher values would result.

We are continuing this study of degradation of the carbohydrate during its isolation from wood with the object of determining data on the kinetics of the pulping processes.

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The Kinetics of Cellulose Reactions

I. A Study of the Pentosan Determination

By R. G. Cooke[1]

Abstract

The method for determination of pentosans has been subjected to a kinetic study, and the curves have been analysed mathematically to reveal the mechanism of the process. It is claimed that a more accurate measure of the pentosan content of natural celluloses has been established, that certain "corrections" which have been suggested in the literature are invalid, and that most of the uncertainties of the empirical method, and arbitrary conversion factors, have been resolved. Suggestions are given for obtaining a reliable value much more rapidly.

The method for determination of pentosans, based on the work of Kröber *(1)*, is too well-known to require any detailed description. The material to be analysed is distilled with 12% (3.5*N*) hydrochloric acid under standard conditions, and generally in apparatus of fixed design and dimensions *(2)*. The furfural evolved is collected in a fixed volume of distillate and generally determined gravimetrically by precipitation with phloroglucinol or a barbituric acid derivative. The method is one of the best examples of a purely empirical procedure, which, while being an ingenious answer to a problem in analysis, is of necessity based on arbitrary assumptions, because the mechanism of the process is not fully understood.

In connection with some investigations on the cellulose of Australian woods, the unsatisfactory position of this method of analysis has resulted in a further attempt to clarify the subject.

There is voluminous literature devoted to both the distillation and the determination of furfural. Kröber's factors for conversion of furfural to pentosan were based on the observed yield of the aldehyde from pure pentoses. These yields were less than theoretical, and many attempts have been made to increase them by varying the conditions and using different acids. Nearly theoretical yields of furfural from pure pentose were obtained by saturating the mixture in the flask with common salt and distilling in a current of steam *(3)*. It has been shown also, that the use of 40% hydrobromic acid increases the yield *(4)*.

The furfural has been determined in many ways. The precipitation with phloroglucinol has proved fairly satisfactory, but the gravimetric methods have many disadvantages. The volumetric bromate-bromide method has been greatly improved by Hughes and Acree *(5)*, and is very reliable when the only oxidizable materials are furfural and its derivatives. It appears to be perfectly satisfactory for ordinary commercial cellulose products. A recent modification of the colorimetric method may have some advantages *(6)*

One of the most recent investigations of the whole subject is described in a paper by Launer and Wilson *(7)*, which gives a great deal of useful information, and suggests a new interpretation of the results to give a "corrected" value of the pentosan content of pulps and papers, which is considerably lower than the usual Kröber figure. This paper also presents results of the study of the rates of evolution of volatile material (furfural, etc.) from a wide variety of cellulose pulps. From the curves obtained, the authors concluded that the final straight portion between distillate volumes of 300 ml. and 600 ml. could be attributed to volatile material from cellulose only. From the slope of this line they accordingly calculated a value of 0.9% as the apparent pentosan content represented by the volatile material obtained from cellulose for 300 ml. of distillate. They decided also that a theoretical yield of furfural from pentosan was a more logical basis for calculation than the 88% recovery found for the distillation of xylose under the same conditions, and assumed to apply to xylan also. The third correction was an allowance for 3% loss in distilling furfural under the experimental conditions.

In the present investigation it was decided that further study by the kinetic method was the most promising line of attack.

Pulps and Procedures

Purified celluloses from eucalypt kraft pulps were prepared in the laboratory by the use of commercially applicable methods. Two of these purified pulps, with nearly identical chemical characteristics, but with different processing histories and cuprammonia viscosities, were selected for kinetic study by methods analogous to those of Launer and Wilson *(7)*. The distillations were performed in a closed system composed of ordinary stock apparatus. An ordinary Wurtz flask (500 ml.) was fitted with a dropping funnel, and was attached to a Davies condenser. The latter was connected through an adapter to a 1-liter bottle, which was graduated at 25 ml. intervals. Rubber stoppers were used throughout. In order to maintain conditions as uniform as possible, the 12% hydrochloric acid was added continuously from the dropping funnel at the same rate as liquid distilled. The level in the flask was thus maintained constant throughout the distillation. The volatile material in the distillate was determined by the improved volumetric method *(7)*, and was assumed for purposes of calculation to consist of furfural only. Blank values were determined frequently by analysing 300 ml. of the same acid after distillation under the same conditions. In constructing curves for the rate of evolution of "furfural" from the pulps, each point was determined by duplicate distillations of the particular volume required. Thus, at least twelve separate distillations, each using 1 gram of moisture-free pulp, were required to construct the complete curve.

The percentage pentosan for the ordinates of the curves was calculated from the following relationship:

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$$\% \text{ Pentosan} = \frac{0.0480 \times N \times (v_1 - v_2)}{w \times 0.727}$$

where: v_1 = volume of thiosulphate consumed in blank.
v_2 = volume of thiosulphate consumed in test.
N = normality of thiosulphate.
w = grams of moisture free pulp.
0.0480 = grams of furfural equivalent to 1 ml. of 0.1N sodium thiosulphate.
0.727 = theoretical conversion factor of furfural to pentosan.

The results obtained with 300 ml. of distillate, when calculated on the basis of 88% recovery of furfural, agreed fairly closely with the values obtained by the usual standard routine method.

The kinetic curves were found to be similar to those reported by Launer and Wilson *(7)*, and pulps of identical pentosan content (as measured by the usual method) gave identical curves, even when their histories were very different. These results, added to those of the previous workers, suggest that this type of curve is of quite general occurence. The form of the curves is shown in Fig. 1.

Mathematical Analysis

The "straight" portion of the Launer and Wilson curves appeared to be only very approximately straight in the results obtained in this investigation, and the slope of the best straight line which could be drawn, indicated that the yield of volatile material from cellulose would be greater than that deduced by Launer and Wilson. By their reasoning this would indicate that the rate of hydrolysis of the eucalypt (hardwood) cellulose was greater than that of the wood pulps studied by them. That this is not so will be demonstrated in the sequel.

It was decided that some more useful information might be obtained from the curves by a mathematical analysis based on known facts of reaction kinetics. It was realized that an assumption of fairly stable temperature conditions was implicit in such an attempt, but it will be demonstrated eventually that this assumption was justified. The mathematical analysis can be based on the curves as they stand, because the ordinates represent a concentration and, since the rate of distillation is constant and time was counted from the onset of boiling, the abscissae also represent time.

If the percentage pentosan (as defined above) be represented by x, and the volume of distillate in milliliters by t, the argument may be stated as follows: The values of xt were first plotted against t for the eucalypt pulps, and also for the pulps plotted by Launner and Wilson. In all cases the points lay very close to straight lines, which all appeared to converge at $xt = 0$ to a value of t very close to 50 ml. This suggested that the original curves of x against t involve an hyperbola of the general form

$$x = k + k'/t \qquad (1)$$

where k' will be negative.

An hyperbola of this form was found to fit the experimental points fairly well for intermediate values of t. The suggestion of a straight-line component of the experimental curve by Launer and Wilson then led to the combination of a general hyperbola with a general straight line.

$$x_1 = k + k'/t$$
$$x_2 = k_1 t \qquad (2)$$

Adding $\quad x_1 + x_2 = k_1 t + k + k'/t$

or $\quad t(x_1 + x_2) = k_1 t^2 + kt + k' \qquad (3)$

This equation is of the form

$$[xt] = \alpha t^2 + \beta t + \gamma \qquad (4)$$

and represents a parabola.

An examination of the plots of xt against t showed that they might easily represent parabolas rather than straight lines. Therefore by substituting the values for three experimental points in Equation 4 the constants were evaluated and the following equation obtained for a eucalypt pulp.

$$xt = 0.00133t^2 + 8.27t - 390$$

This fits all the experimental points from 100 ml. to 600 ml. very well and indicates that the plot of xt against t really does fit a parabola, and the original experimental curve of x against t may be a combination of a straight line and an hyperbola. It follows that the original experimental curve would be represented by

$$x = 0.00133t + 8.27 - 390/t \qquad (5)$$

This equation fits the experimental points from 100 ml. to 600 ml. quite well, and is composed of the hyperbola

$$x_1 = 8.27 - 390/t \qquad (6)$$

and the straight line

$$x_2 = 0.00133t \qquad (7)$$

Curves which illustrate these results are given in Fig. 2.

Discussion

These results suggest that the observed curves may be a measure of two independent reaction mechanisms, one of zero order (represented by the straight line), and one of second order, which is represented fairly closely by an hyperbola for the higher values of x. If the zero order reaction represented by Equation 7 be associated with the production of volatile

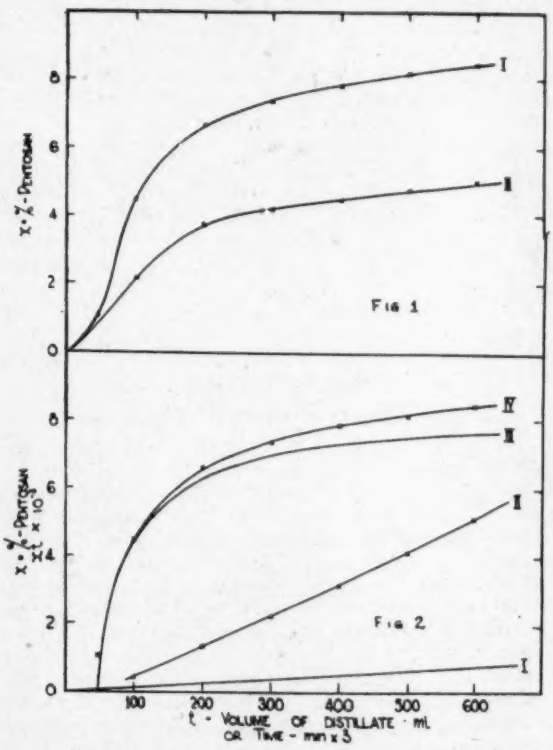

FIG. 1

Curve I Experimental results for eucalypt pulp
Curve II Experimental results for sulphite pulp (Launer & Wilson)

FIG. 2

Curve I	Straight line	$x = 0.00133\,t$
Curve II	Parabola	$[xt] = 0.00133\,t^2 + 8.27\,t - 390$
Curve III	Hyperbola	$x = 8.27 - 390/t$
Curve IV	(I + III)	$x = 0.00133\,t + 8.27 - 390/t$

material from cellulose, then the Equation 6 may logically be associated with the formation of furfural from pentosan, and may be taken to approximate closely to the course of that reaction during its later stages. It is preferable to use the hyperbolic equation for the present argument, rather than the true second order reaction equation, because it is sufficiently accurate to demonstrate the general conclusions, and the use of the other equation is not justified by the experimental conditions.

The first important conclusion is that for large values of t in Equation 6 the value x, or percentage pentosan, approaches a limiting value which represents the completion of the reaction, and is equal to 8.27% for the pulp in question. This means that the value of the constant k in Equation 1 represents the total pentosan content, and it appears that this will be the only variable in the equation as applied to different pulps. It will be noticed that the value of x at 360 ml. is about 87% of the limiting value. This close agreement with the value 88% for the recovery of furfural from pure xylose is striking support for the suggestion that the hyperbola Equation 6 is a good representation of the rate of formation of furfural by dehydration of xylose under the experimental conditions. It also indicates that the often repeated explanations for the low yield — side reactions or destruction of furfural — are erroneous, and that substantially theoretical yields would be obtained if the reaction were allowed to proceed long enough. All modifications which have been suggested for increasing the yield are such as would be expected to increase the *rate* of reaction.

This interpretation also suggests that the hydrolysis of the xylan to xylose, which would be expected to show first order characteristics, is a relatively rapid reaction and cannot be the rate determining step.

Now let us consider Equation 7. If this represents the evolution of volatile material from cellulose, then it is apparently controlled by a reaction of zero order. This suggests hydrolysis of cellulose controlled by the available surface, because homogeneous acid catalysed hydrolysis would be expected to show first order characteristics, and the dehydration of glucose to hydroxymethylfurfural would be expected to follow the same reaction mechanism as the analogous reaction of xylose. This is supported by the very much greater rate of evolution of volatile material from an equivalent weight of pure glucose distilled under the same conditions. Furthermore, the loss on redistillation of the distillate is always stated to be due to the loss of the hydroxymethylfurfural, and Launer and Wilson give some figures which indicate that the loss corresponds to 0.4% as pentosan for 300 ml. of distillate. This corresponds to the value given by the straight line deduced above, and suggests that the rate of hydrolysis of cellulose from different sources is the same under these conditions. However, Launer and Wilson concluded that the usual loss is about 0.8%. This might be possible with pulps which contain a hexosan fraction distinct from cellulose, and capable of very rapid hydrolysis. The volatile material from such sources would no doubt be included in the furfural curve, because the reaction mechanisms would then be similar.

It has been pointed out that the hyperbolic equation fits the experimental points only for values of t above 100 ml. It is obvious that the hyperbola cannot represent the experimental results below that value, and in fact cannot pass through the origin. The curve of the second order reaction equation will pass through the origin.

Significance of Temperature

All the above discussion implies that the temperature of the reaction medium remains constant. The results obtained suggest that this must be so during the greater part of the reaction. However, if 12% hydrochloric acid be distilled it should become more concentrated, and its boiling point should rise gradually until the constant boiling composition is reached, and should then remain constant. It is evident, therefore, that the composition of the acid in the flask must reach the constant boiling value by the time 100 ml. of distillate has been collected, and must remain at the same value during the rest of the distillation. This concentration is about 6N and, if the acid is originally 12% (3.5N), the first 100 ml. of distillate will have a concentration near 1N, and any further distillate will have a concentration of 3.5N, provided acid of that concentration is added continuously at the same rate as the distillation proceeds. The concentration in the flask, and consequently the reaction temperature also, will remain constant after the first 100 ml. of distillate has been collected. This conclusion was checked by analysing successive 100 ml. aliquots of the distillate for hydrochloric acid content. The first showed a concentration of 1.06N, and the value then rose to 3.53N and remained near that value for further fractions. Finally some of the acid was distilled from a Claisen flask fitted with a dropping funnel, and a thermometer dipping into the liquid. As in all the pentosan determinations, porous porcelain was added to maintain steady boiling. The level of acid in the flask was kept constant by continuous addition, and it was noted that the temperature rose slowly during the distillation of the first 100 ml. from 107-110°C. It then remained constant during the distillation of several hundred milliliters of acid. No variation greater than 0.3°C. was observed, and such variations were only momentary. It follows that the use of constant boiling acid would be more satisfactory for more accurate kinetic studies than the 12% acid now in use, because the early change in temperature probably affects the position of the curve. Even for ordinary analysis the constant boiling acid would be more logical.

Rapid Determination of Pentosans

It would seem that we are now in a position to establish a much more rapid determination of pentosans, which is free of much of the empirical uncertainty of the present method. This method will be of most value for relatively simple mixtures like the commercial pulps and papers. It may be adaptable to more complex mixtures of carbohydrates if a full kinetic study of such mixtures is made. It would be best to adopt constant boiling hydrochloric acid, but the results obtained in this investigation will serve fairly well, and the approximate equations will suffice for analytical purposes.

It may easily be shown that Equation 5 can be simplified to the form

$$x = 0.00133t + k - 47k/t \qquad (8)$$

Thus, using a suitable weight of pulp, it is necessary to determine only one accurate experimental value at some point in the region for which the equation is a close approximation, substitute the values in Equation 8, and determine k. This will be the value for

the pentosan content of the sample. The volume collected may be as low as 100 ml. and this means that using the rapid volumetric determination of furfural, a complete pentosan analysis may be completed in less than one hour. However, because the furfural is being evolved most rapidly at about this point, more precision is required in the control of rate of distillation, addition of acid, and total reaction time. More accurate results will be obtained for the larger volumes of distillate.

Conclusion

It is considered that the value of pentosan content deduced from this work rests on a sounder basis than has been possible before. The value may include furfural from uronic acid units, and hydroxymethylfurfural from easily hydrolyzed hexosans, but corrections could be applied for these if required. In any case it is considered that the isolation of the reaction attributable to the cellulose is of considerable value.

The methods might be extended to the determination of other pentosans and mixtures of pentosans, if the rates of evolution of furfural from the pure pentoses are fully investigated. Some relevant results are given in a recent paper *(8)*.

In view of the temperature change in the early stages, and the necessity for refinements of technique for more accurate kinetic studies, calculations from the second order reaction equation are not justified; but the type of equation which can be deduced may be illustrated as follows:

The second order equation

$$k' = \frac{1}{at} \cdot \frac{x_1}{a - x_1}$$

may be arranged to give

$$x_1 = \frac{k'at^2}{1 + k't}$$

Adding the straight line

$$x_1 = kt$$

we obtain

$$x = kt + \frac{k'at^2}{1 + k't}$$

or

$$x = kt + a - \frac{a}{1 + k't} \qquad (9)$$

This equation may be compared with the similar form of Equation 8

$$x = kt + b - bk'/t$$

Acknowledgments

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The Corrosion Problem and How it May be Solved*

By Herbert B. McKean[1]

Abstract

Proper protection of metal and metal parts from corrosion is an integral function of packaging. In the packaging courses given for authorized representatives of the Army, Navy, and manufacturers, the Forest Products Laboratory places great stress on methods and materials for corrosion prevention in packaging for overseas shipment. The procedures are discussed.

Wartime conditions of shipment and storage are much more conducive to corrosion than are peacetime conditions since boxes of supplies are stored in the open under varied climatic conditions for relatively long periods.

Causes of Corrosion

The most important single cause of corrosion is the combined action of oxygen and moisture. Moisture or high humidity alone does not cause rust for it has been demonstrated that both oxygen and moisture are required to cause corrosion. However, because moisture is the more easily controlled of the two, it is exploited in Method II packaging, in which the relative humidity inside a vaporproof barrier is maintained at a point lower than 30%.

Another cause of corrosion is acid or acid fumes. In ordinary manufacturing operations, this corrosive agent is frequently encountered in most stack gases, in many cutting oils, and probably the most troublesome of all, in human perspiration. Much difficulty in preserving parts arises from perspiration acid which is on metal as a result of handling.

One other so-called cause of corrosion which is worth considering is that generally attributed to salt water or salt atmosphere. Actually, salt water is not a corrosive agent: the corrosion is caused by the combined action of oxygen and moisture, with the salt acting as a catalyst to hasten the reaction. This has been demonstrated by placing bright steel in a test tube of ocean water obtained 12 miles off shore, removing the dissolved oxygen present in and above the water, and then sealing the test tube. Strips of metal subjected to this treatment have remained bright for a decade or more.

Cleaning Methods

An often overlooked, but nevertheless very im-

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[2]Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

portant step in the proper preservation of metal is thorough cleaning prior to the application of preservatives. If corrosive materials are left on the surface of a part and a corrosion preventive applied over them, it will only serve to protect the corrosive material from being removed rather than protecting the part itself. Without thorough cleaning, metal parts might just as well not be preserved.

For the purpose of this discussion, two classes of cleaning, solvent and alkaline will be considered. There are a number of procedures for each class. Three commonly used procedures, immersion cleaning, spray cleaning, and vapor degreasing, are used in solvent cleaning.

Solvent immersion cleaning, as the name implies, is accomplished by immersing the parts of the cleaning solution and may be done in either one or two steps. In the one-step procedure, one tank of solvent is used and the parts are immersed in this solvent. This is the least effective of all the solvent-cleaning procedures because, as dirt from parts is accumulated in the tank, it finally may be added rather than removed from metal unless the solvent is replaced frequently. To overcome this difficulty, the two-step immersion method can be used. With this method, two tanks of solvent are needed. The first tank removes most of the dirt so that the second tank remains relatively clean over relatively long periods of use. In this way the part is given a preliminary cleaning in the first tank and is thoroughly cleaned in the second but with either immersion method, washing with solvent soaked rags or brushing is necessary to remove completely many contaminates. The solvent used with this type of cleaning should be a neutral, water-white petroleum distillate having a minimum flash point of 105° F. (Stoddard solvent or dry cleaners' naphtha).

Solvent spray cleaning uses the same solvents required for immersion cleaning, but in many respects is more satisfactory. This is true because the mechanical action of the spray is of assistance in removing certain contaminates, particularly inorganic materials.

Note: In all cleaning operations where Stoddard solvent or naphtha is used, precautions must be taken against fire, as these are highly inflammable materials. For the same reason, they should not be heated for cleaning operations.

Vapor degreasing is one of the most satisfactory procedures for cleaning parts, primarily because only clean solvent ever comes in contact with the part. Another advantage is that the temperature of the part is raised during the cleaning operation, so that the solvent dries rapidly when the cleaning is completed. The simplest form of vapor degreaser consists of a tank in which a solvent, such as trichlorethylene or perchlorethylene is heated by steam coils or other means and as it evaporates, the vapor rises in the degreaser until it comes in contact with a water jacket near the top of the apparatus, the cool surface of which condenses the vapors, which then flow back into the bottom of the equipment. The part that is to be cleaned is placed in these vapors. As the part is cold, some of the vapors condense on its surface in sufficient quantity to flow back into the tank. While flowing over the part, the solvent removes the contaminates. This procedure may be carried a little further by immersing the parts in a hot rinse to complete the cleaning. Occasionally, a third step is introduced in which the parts are again suspended in the vapors for a final cleaning. As solvents will not neutralize the perspiration acids, methanol, containing about 5% water, is required as a final rinse whenever finished surfaces have been handled by bare hands.

Several types of alkaline cleaning are popular. The simplest of these is alkaline immersion cleaning, which is accomplished by immersing the part to be cleaned in the hot solution. Another procedure is to spray the parts to be cleaned with the hot alkaline solution. These methods are frequently combined to get more thorough cleaning, as the mechanical action of the spray is particularly effective in removing certain types of contaminates.

A third method of alkaline cleaning is called alkaline electrocleaning. By this method, electric current is employed to provide more thorough cleaning and if properly controlled, may even be used for rust removal. One formula for alkaline cleaners that has been found satisfactory in some plants is:

Sodium carbonate, anhydrous.	46%
Trisodium phosphate	32%
Sodium hydroxide	16%
Rosin	6%

Six to 10 ounces of this mixture is added to 1 gallon of water.

Immediately following any alkaline cleaning process, parts should be rinsed in hot water at not less than 180° F. Normally, the rinsing tank should be kept constantly overflowing to prevent formation of scum on the surface of the water. Following the rinse, the parts should be immediately dried either in an oven or by compressed air, or, if these are not available, wiped with clean cloths.

Preservative Treatments

Following the cleaning procedure, either of two classes of preservative treatment may be used. Method I preservation involves the application of a particular type of greasy or oily material to the surfaces to be protected. In industry, it is frequently called "slushing". This type of preservation is the major topic of this discussion. Method II accomplishes its purpose by means of dehydration, but no discussion of this type will be given here.

A number of different materials may be used in Method I preservation. One is a heavy petrolatum, covered under Specification No. U. S. A. 2-82-c and Army-Navy Specification AN-C-52. According to these specifications, this material must have a minimum melting point of 150° F. and should be applied at a temperature ranging from 280 to 210° F. Heavy petrolatum is an extremely good preservative for metal that may be subjected to any unusual corrosion hazard. It is reported by engineers that this preservative will give satisfactory results on metal exposed to the weather for a year or more. Its main disadvantage is the extreme difficulty encountered in its removal. However, during shipment and storage this is not a disadvantage, but when the part is to be used the preservative should be easily removable with solvent. Heavy petrolatum requires rubbing in addition to simple solvent action for its complete removal, consequently it should not be used for preservation of any part that has surfaces that cannot be reached with a swab to wipe it off. For example, crank shafts which contain oil passages should not be treated with this preservative since more than one bearing has been burned out because the heavy petrolatum had clogged the oil passages.

Another preservative that is widely used is light petrolatum, descriptions of which are found in Specifications U. S. A. 2-84-b and AN-C-52. According

to the specifications, the minimum melting point is 120° F., application temperature is between 150 and 180° F. This light petrolatum which contains rust inhibitors and resembles ordinary lightweight lubricating grease, was designed primarily to provide protection against corrosion under the conditions normally met in the warehouse. Since all boxes for overseas shipment of war supplies are to be lined with a waterproof paper, and each container is, in effect, a warehouse, light petrolatum is ideally suited for the preparation of materials for shipment. It can be used safely on almost any bright metal part except possibly assembled bearings.

A third preservative is a cut-back material which derives its name from the fact that it is a preservative dissolved in a solvent. This material is liquid at room temperature and is made to conform to Tentative Specification AXS-673 and Type I preservative of AN-C-52. Cut-back preservatives may be applied by dipping at room temperature. Upon removal from the dip, the material dries as a result of the evaporation of the solvent, leaving a tough, thin film which after several weeks' exposure to the atmosphere, resembles paint in film thickness and appearance. When thoroughly dried, this preservative provides the most abrasion-resistant protection of any of the preservatives now available.

Another group of preservatives, known generally as preserving and lubricating oils, are covered under a number of different specifications and represent a rather broad range of viscosities. Each type, however, has a specific function, e.g., one material is a concentrate which, when added in certain proportions to lubricating oils, is used as the lubricant during the last 15 minutes of a test run for aircraft engines. This preservative possesses not only preservative and lubricating properties but acid-neutralizing materials which are required to overcome the hydrobromic acid formed in the combustion chamber of the engine by the burning gasoline. This mixed oil will not provide complete lubrication for long periods or at high engine speeds. The Army Ordnance Department has a somewhat similar material for lubrication and preservation of truck and stationary engines which is provided by the manufacturer with rust inhibitors and acid neutralizer already added. This oil requires no mixing by the user.

Two very light grades of preserving and lubricating oils, developed for specific purposes, differ from the previously-mentioned oils not only in having lower viscosities but also in that they contain no acid neutralizer. These materials have been developed essentially for the preservation and lubrication of the working parts of automatic rifles during service. One of these oils is used by troops to lubricate and preserve their arms. The other is an extremely light oil designed particularly to preserve and lubricate machine guns used in high-altitude aircraft. This oil is light enough to permit the gun to operate at temperatures well below 0° F. and prevents corrosion for short periods of time.

Methods of Treatment

There are four methods by means of which these preservatives can be applied. Probably the best is the hot dip. The greatest advantage of this method is that the preservative is heated sufficiently to remove any moisture that may be adhering to the part but is limited to the petrolatum type of preservative. An important requirement with this treatment is that a proper film thickness of preservative be placed on the part; generally for the heavy petrolatum, a film thickness of 1/32-inch is desirable and, for the light petrolatum, a 1/64-inch film is optimum. To obtain these desired coatings, it is generally necessary to develop a time-temperature relationship for the particular part being preserved. A small part dipped in a bath of a light petrolatum at 160° F. might obtain the desired film thickness in a relatively short immersion. A larger part, however, might require two or three times as long because of the greater mass of metal that must be heated. Therefore no hard and fast rule can be made regarding dipping time.

Another method of application, which may be used with all of the preservatives mentioned, is spraying. This method is relatively simple with the cut-back preservative or the preserving and lubricating oils. On the other hand, to apply petrolatum preservatives with a spray gun requires some means of keeping the material liquid and the best way of accomplishing this is to have a heated container on the spray gun. Many operators keep the material liquid by adding solvents to the melted petrolatum, but this procedure is not generally recommended. Spraying is particularly effective with parts that are too large to be dipped, such as the exterior surfaces of an airplane, or a cylinder block.

An important adjunct of any spraying apparatus is a vapor trap in the air line. Such a trap, which contains a dehydrating agent, is necessary because a relatively large quantity of vapor is trapped in compressed air. This vapor is sprayed on the part with the preservative unless completely removed by a vapor trap. To determine the effectiveness of the vapor trap, all that is necessary is to blow the air from the air line on a piece of clean bright metal. If condensation occurs on the metal, the vapor trap is inadequate, if the metal remains dry, the vapor trap is satisfactory. The dehydrating agent in the trap must be replaced at frequent intervals.

A third method of application is a cold dip. This procedure can be used only with those preservatives that are liquid at room temperature. The process provides a thorough coating but has no tendency to remove water, as does the hot dipping method, otherwise it is equivalent. The cold dip can be used with satisfactory results on any part treated with a suitable preservative.

The fourth method of application is brushing. In general, this is the least satisfactory of any of the preserving methods. Its chief shortcoming is that the bristles of the brush have a tendency to make thin streaks in the preservative coating but it does have at least one specific application, however, for which the other procedures cannot equal it. In the application of preservatives to any item, portions of which should not be touched by the preservative, it is possible with the brush to work the edge of the bare metal without getting any of the preservative on surfaces it should not touch. This would be the case with any part to which is attached felt, rubber, or any other material that would be damaged by the preservative.

If the procedures outlined above are carefully followed, using the proper materials, it can be reasonably expected that war materials will arrive overseas in usable condition. It is important, however, that each step be carried out with care, for, like a chain, a preservative procedure is only as strong as its weakest link. If the cleaning is inadequate, no amount

of properly applied preservative will safeguard the part. On the other hand, the most thorough cleaning possible cannot prevent parts from corroding if the preservative is not properly applied.

Greaseproof Wrapping Materials

In addition to proper preservation, it is necessary to use other materials if war supplies are to be delivered in satisfactory condition. After the part has been preserved, it must be wrapped in a greaseproof wrapping and shipped in a box lined with a waterproof paper.

Greaseproof wrapping material must be used for several reasons. First and most important, it is applied around the part to protect the preservative material. Another reason is that the greaseproof wrapper makes it possible to handle metal objects without leaving fingerprints on the parts as a result of perspiration acids. The wrapping also protects the grease on the part from dust and dirt, so that wrapped parts can be safely stored in open bins.

Two specifications in current use set up the standards which must be met by these greaseproof materials. These specifications are: AN-P-12a, entitled, "Paper; Greaseproof Wrapping," and AXS-840, Revision 1, entitled, "Wrapping; Greaseproof." In the former, two Grades, A and B, are recognized. The latter specification lists three Grades, A, B, and C. Both specifications prescribe a number of requirements which must be met by greaseproof wrappers. The greaseproofness is determined by a turpentine penetration test. It is required in AN-P-12a that the material be resistant to the passage of turpentine for 1,200 seconds on a flat sheet. Specification AXS-840 requires that the turpentine resistance shall be 300 seconds on a folded sheet. There is also a limit stated for the amount of sulphur trioxide permitted in the paper. Furthermore, it is required that the sheets have sufficient strength to avoid tearing during wrapping. Grades A and C must have a pH value between 6.5 and 7.5. Grade B, however, may have a pH range between 5 and 8. By limiting the pH value so rigidly in Grades A and C, a material is provided that can be safely wrapped around even the most highly finished metal part without danger of acid corrosion being caused by the paper. Frequently, however, it is assumed by many that the limitation on the pH value will in some way prevent corrosion. This is absolutely not the case, as far as specifications are concerned as Grade A or C paper in itself will not prevent corrosion. Because they are neutral, Grade A or C wrappers only should be used for wrapping parts having highly finished surfaces on which even the slightest amount of corrosion might destroy the usefulneess of the part. Grade B, on the other hand, should be used only on those materials where close tolerances are not necessary, such as castings and forgings. There are additional requirements for these materials. For example, Grade A is always colored red, Grade C is green, and Grade B is an unpigmented sheet. Where color is required it may be solid or striped. The purpose of the color is primarily to assist the packer in quickly determining which paper he is using and is certainly no guarantee that the paper meets the requirements of the various specifications.

Grade C has two additional properties which make it different from Grade A. In the first place, it must be tacky so that it is more or less self-sealing. In the second place, it should be moldable so that a crease can be made in the sheet and there will be little or no spring-back. These properties have been specified in order to obtain a sheet that can be tightly wrapped around parts being packaged. There is nothing whatsoever in the specifications that requires these materials to be water vaporproof, therefore, until the materials have been proven to be vaporproof and are so accepted by the various agencies of the armed forces, they should not be used as vaporproof barriers in conjunction with Method II preservation.

Grade C wrappers are used to provide what is called an "intimate wrap." The wrapping material is in full contact with all enclosed surfaces of the part. Generally these packages are dipped in a wax sealer to provide a waterproof container known as a I-A pack. The present status of this I-A package is that any material that can provide a waterproof covering can be used to make the wrap. In other words, any waterproof sheet that can be satisfactorily sealed may be used to make this type of wrapping.

The wrapping of parts in Grade A or B sheets generally is not intended to provide a waterproof or water vaporproof wrap. On the contrary, it should be so applied as to permit any water that may get inside the wrapper to drain out or evaporate readily. It is not important whether the source of water is condensed moisture, rain, or sea water that has leaked in to the container. Sealing of the A or B Grades is accomplished by a gummed tape which is applied in a manner that will merely prevent the paper itself from unfolding and exposing the part. Such a seal will leave most of the outside edge of the wrapper unsealed.

The last step in packaging that has any effect in preventing corrosion is the lining of the container with a waterproof paper. There are a great many papers available for this purpose and almost all of them consist of at least two layers of paper with a film of asphalt between them. The water resistance of these sheets varies widely, but for overseas shipment it is desirable to use sheets that resist the passage of water for at least 48 hours as determined by the dry-indicator method.

In the light of experience acquired during recent months, the prefabricated bag has become the most desirable way of applying waterproof box liners. These liners can be purchased or made by the shipper to fit individual boxes. There are other ways of lining containers, but the bag is generally conceded to be the best.

If meticulous care is exercised in the application of all these materials, it should be possible to ship war supplies of a metallic nature to any place in the world without fear of the parts being damaged by corrosion.

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New York Paper and Pulp Market Review

Canada Reports Newsprint Production Available To U. S. Will Be 200,000 Tons Monthly In 1944 — Paper and Pulp Markets Tight —Mill Demand For Waste Paper Urgent—Scrap Bagging Is Slow.

Office of the PAPER TRADE JOURNAL.
Wednesday, December 22, 1943.

Demand for all lines of paper continues heavy, with the reports of most of many manufacturers' representatives, jobbers, and general paper merchants, reflecting difficulty in getting shipments and in meeting customers' requirements. A continued tight market is expected to continue until the pulwood supply situation and the collection of waste paper is very substantially improved. More of these vital raw materials is urgently needed.

The index of general business activity declined to 148.0 for the week ended December 11, from 148.7 for the previous week, compared with 134.5 for the corresponding week last year. The index of paper board production was 152.2, compared with 154.0 for the previous week, and with 141.0 for the corresponding week last year.

Paper production for the week ended December 11 was estimated at 89.6%, compared with 88.4% for 1942, with 106.3% for 1941, with 90.6% for 1940, and with 97.2% for the corresponding week for 1939.

Paper board production for the week ended December 11 was 96.0%, compared with 84.0% for 1942, with 101.0% for 1941, with 79.0% for 1940, and with 79.0% for the corresponding week for 1939.

The Canadian Wartime Prices and Trade Board announced on December 19, that newsprint production will be at a monthly rate of 252,000 tons, of which 200,000 tons will be available to the United States, 15,400 tons for Canada, and 37,500 tons for overseas shipments. The schedule will become effective January 1, 1944.

Business inventories of manufacturers, wholesalers and retailers were increased by $200 million during October, the Department of Commerce has announced. The indexes of the value of manufacturers' shipments for October, 1943, all industries, was 270; durable goods, 373; non-durable goods, 191, compared with 240, 289, and 181 respectively for October, 1942.

The index of the value of manufacturers' shipments of paper and allied products for October, 1943, was 166 (high of the year), compared with 146 for October, 1942.

The index of the value of manufacturers' inventories for all industries for October, 1943, was 179 (high of the year); durable goods, 213.5; non-durable goods, 149.2. This compares with 176.5 for all industries, with 204.1 for durable goods, and with 152.4 for non-durable goods for October, 1942.

The index of the value of manufacturers' inventories of paper and allied products for October, 1943, was 129.6 (low of the year), compared with 149.8 for October, 1942.

Wood Pulp

According to the proposed schedule of Canadian wood pulp issued by the W.P.T.B., shipments to the United States will be at the annual rate of 1,100,000 tons, to take effect the first of the year.

Rags

Mill demand for cotton cuttings is heavy to meet government requirements for fine papers. Ceiling prices are firmly maintained.

Demand for the roofing grades of old cotton rags is active. Mixed and other grades of old rags are moderately active at this date.

Old Rope and Bagging

No important change in the old Manila rope market has been reported this week. Mill demand continues urgent for all available supplies of hard fiber at ceiling prices.

Trading in scrap bagging has declined the past week and the market is currently reported as slow. Nominal prices prevail.

Old Waste Paper

Mill demand for most grades of waste paper continues heavy and supplies are still reported short of needs. The market is strong and ceiling prices are maintained.

Twine

Demand for twine and cordage for military requirements continues heavy. Limitations of uses established by the WPB are reported as being strictly observed. More kraft paper twine and rope are being used for ordinary purposes.

Paper Articles Disappear in England

Napkins, handkerchiefs and paper ornaments and many other common articles made of paper have completely disappeared in England, according to Edwin C. Jahn, professor of forest chemistry at the New York State College of Forestry, Syracuse University, who has been visiting in London and now is in Sweden.

He writes, "The letter the Britisher receives is usually sent in a re-used envelope having a war economy label to cover the old address. The importance of saving and recovering paper is impressed upon the British people by posters, newspapers, radio, exhibits and motion pictures. Exhibits and pictures show the military uses of paper such as its place in making shell cases, parts of shell fuse assembly, tubes to be filled with explosives, demolition containers, grenade tubes, section of a wing of a mosquito bomber showing paper and plywood in combination, and many objects of laminated paper treated with resin, including mechanical and electrical parts for gun controls, airplanes, ships and tanks."

Professor Jahn says, "The Britisher's newspaper is only a fraction of its former size and he is lucky to get one. When he buys an article in the store he must carry his purchase home unwrapped. A pipe smoker must bring a container when he buys tobacco."

Season's Greetings

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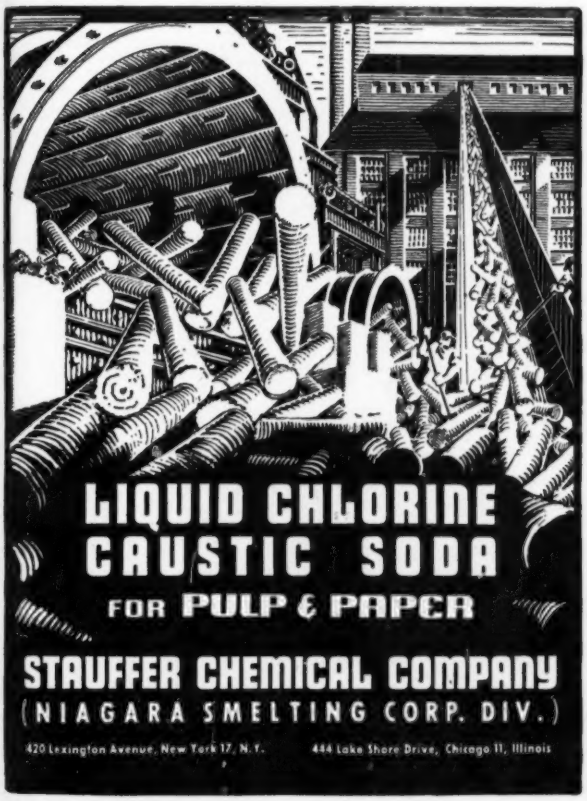

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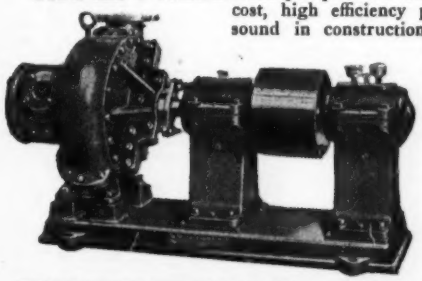

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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday December 22, 1943.

BLANC FIXE—The market situation in blanc fixe continues to be reported unchanged. Prices are firm. The current quotation is $40 per ton for the pulp, in barrels, at works. The powder is quoted at $60 per ton, f.o.b., works.

BLEACHING POWDER — No important change in bleaching powder has been reported this week. Demand is active, prices unchanged. Current quotations range from $2.50 to $3.10 per 100 pounds, in drums, car lots, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24½ cents per pound; less than 2,000, 24¾ cents per pound, f.o.b., shipping point. Imported 12 cents per pound, f.o.b., source.

CAUSTIC SODA—Demand for caustic soda continues to be reported as very heavy. Shipments very large, with lend-lease requirements heavier. Quotations are firm and unchanged. The current quotation on solid caustic soda is $2.30 per 100 pounds; flake and ground are quoted at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay continue unchanged. Domestic filled clay is quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported china clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—A short supply situation for civilian requirements is again reported this week. Quotations are unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosin are lower this week. "G" gum rosin is currently quoted at $4.00 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $3.97 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $4.19 per 100 pounds, f.o.b., works.

SALT CAKE—The market for salt cake is reported unchanged. Demand continues steady. Domestic salt cake is currently quoted at $15 per ton, in bulk; chrome cake is quoted at $16 per ton. All prices in car lots, f.o.b., shipping point.

SODA ASH—The market for soda ash continues tight. Demand is still reported in excess of supply. Quotations are firm and conform to prevailing prices. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—No real improvement in supply of cash corn is reported and market is tight at this date. Prices are unchanged. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Demand and shipments of sulphate of alumina is reported normal at this date. Iron free tight, due to restrictions. The commercial grades are quoted at from $1.15 to $1.25 per 100 pounds; iron free is quoted at $2.35 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR — Demand for sulphur continues heavy. Quotations continue unchanged. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. The current contract quotation at Gulf Ports is $17.50 per long ton.

TALC—Prices on talc are unchanged and continue to conform to prevailing market levels. Domestic talc is currently quoted at from $16 to $21 per ton, at mines

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—			
Roll, contract	*$58.00	@	—
Sheets	64.00	"	—
* OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.60	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*48.00	@	—
Chip	*48.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
100% Rag Ext. No. 1	$39.10@$46.00		$40.25@$47.25
100% Rag	32.20 "	37.75	33.35 " 39.25
85% Rag	.... "	....	29.90 " 35.00
75% Rag	23.00 "	27.00	24.15 " 28.25
65% Rag	.... "	....	22.80 " 27.75
50% Rag	18.70 "	22.75	19.90 " 24.25
25% Rag	16.40 "	20.00	17.55 " 21.50

Colors at $1.09 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds		Ledgers
No. 1	$10.55@$12.75		$11.70@$14.25
No. 2	9.65 "	11.75	10.80 " 13.25
No. 3	9.20 "	11.25	10.35 " 12.50
No. 4	8.90 "	10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.3
No. 2 Glossy Coated	12.40	"	14.0
No. 3 Glossy Coated	11.60	"	13.2
No. 4 Glossy Coated	11.15	"	12.7
No. 1 Antique (watermarked)	10.25	"	11.7
No. 2 Offset	9.60	"	11.0
A Grade E. F.	9.35	"	10.7
A Grade S. & S. C.	9.60	"	11.0
B Grade E. F.	8.85	"	10.2
B Grade S. & S. C.	9.10	"	10.5
C Grade E. F.	8.55	"	9.7
C Grade S. & S. C.	8.80	"	10.0
D Grade E. F.	8.25	"	9.5
D Grade S. & S. C.	8.50	"	9.7

Ivory & India at $.50 cwt. extra

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$76.00		
Unbl. Softwood Sulphite	65.00	@	66.00
Bl. Hardwood Sulphite	73.50		
Unbl. Hardwood Sulphite	63.50		
Bl. Mitscherlich	81.00		
Unbl. Mitscherlich	72.00	@	82.00
N. Bleached Sulphate	86.00		
S. Bleached Sulphate	79.00		
N. Semi-Bleached Sulphate	82.00		
S. Semi-Bleached Sulphate	75.00		
N. Unbl. Sulphate	73.00		
S. Unbl. Sulphate	63.50		
Bl. Soda	66.00		
Unbl. Soda	62.00		
Groundwood	46.00		

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.

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A century of metallurgical and machine knife experience your guarantee. Have us quote you.

SIMONDS WORDEN WHITE COMPANY
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SWWCo

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	@	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila		"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07¼	"	.07½
Washable Prints	.03¾	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03¼
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed	1.00	"	1.50
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.50	@	2.75
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	—
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.25	"	3.50
Wool Tares—			
Foreign	(nominal)		

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.50	@	2.75
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	—
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.25	"	3.50
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	—
Aust. Wool Pouches	3.75	"	4.00
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	—*

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¼	"	.05
New White No 1	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¼
Underwear Cutters, Bleached	.06¼	"	06¾
Underwear Cutters, Unbleached	.05¼	"	.06
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¼	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¾	"	.03¾
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¼	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—*
Miscellaneous	3.20	"	—*
White No. 2—			
Miscellaneous	2.65	"	—*
Twos and Blues, Repacked	2.20	"	—*
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—*
Miscellaneous	1.80	"	—*
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—*
No. 2	1.45	"	—*
No. 3	1.35	"	—*
No. 4	1.35	"	—*
No. 5, Quality A	1.35	"	—*
Quality B	1.20	"	—*
Quality C	.95	"	—*
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	1.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—
Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.15	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—